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Learning Activities with Semantic Hypermedia in Higher Education

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I declare that this dissertation is the result of my personal and independent research. Its content is original and all sources used are correctly mentioned in the text, notes and references.

The candidate,

António Maneira

Lisbon, 31 March 2014

I declare that this dissertation is ready to be appreciated by the jury to be appointed.

The advisor,

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To my parents.

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Abstract

The increasing use of information and communication technologies (ICT) in diverse professional and personal contexts calls for new knowledge, and a set of abilities, competences and attitudes, for an active and participative citizenship. In this context it is acknowledged that universities have an important role innovating in the educational use of digital media to promote an inclusive digital literacy. The educational potential of digital technologies and resources has been recognized by both researchers and practitioners. Multiple pedagogical models and research approaches have already contributed to put in evidence the importance of adapting instructional and learning practices and processes to concrete contexts and educational goals. Still, academic and scientific communities believe further investments in ICT research is needed in higher education.

This study focuses on educational models that may contribute to support digital technology uses, where these can have cognitive and educational relevance when compared to analogical technologies. A teaching and learning model, centered in the active role of the students in the exploration, production, presentation and discussion of interactive multimedia materials, was developed and applied using the internet and exploring emergent semantic hypermedia formats.

The research approach focused on the definition of design principles for developing class activities that were applied in three different iterations in undergraduate courses from two institutions, namely the University of Texas at Austin, USA and the University of Lisbon, Portugal. The analysis of this study made possible to evaluate the potential and efficacy of the model proposed and the authoring tool chosen in the support of metacognitive skills and attitudes related to information structuring and management, storytelling and communication, using computers and the internet.

Keywords: semantic hypermedia, higher education, design-based research, digital storytelling, internet

Resumo

A crescente utilização das tecnologias da informação e comunicação (TIC) nos mais diversos contextos profissionais e pessoais requer um conjunto de novos conhecimentos, capacidades, competências e atitudes para uma cidadania ativa e participativa. Neste enquadramento defende-se que as instituições do ensino superior têm um papel importante no sentido de promover uma literacia digital inclusiva, inovando na utilização educativa dos media digitais. O potencial educativo das tecnologias e conteúdos digitais tem sido reconhecido por muitos investigadores e professores, havendo no entanto a consciência junto da comunidade académica e científica, da necessidade de mais investimentos no estudo da utilização de TIC no ensino superior. A multiplicidade de modelos pedagógicos e de abordagens de investigação têm contribuído para evidenciar a importância de adaptar as práticas e processos de ensino e aprendizagem aos contextos e objetivos educativos concretos.

Este estudo centra-se em modelos educativos que permitam potenciar a utilização das tecnologias digitais em aspetos em que os contributos destas, do ponto de vista cognitivo ou educacional, se fazem diferenciar com mais evidência de outras tecnologias analógicas. Recorrendo à exploração de formatos de hipermédia semântico emergentes e ao uso da internet, desenvolveu-se e aplicou-se um modelo de ensino-aprendizagem centrado no papel ativo do aluno na exploração, produção, apresentação e discussão de conteúdos multimédia interativos. A abordagem de investigação focou a definição de princípios de design de atividades integradas na prática letiva tendo sido realizadas três implementações em disciplinas da oferta curricular de duas instituições do ensino superior, designadamente na Universidade do Texas em Austin, USA e na Universidade de Lisboa, Portugal. Foi possível verificar o potencial e a eficácia do modelo proposto e da aplicação autora escolhida para suporte e motivação dos alunos no desenvolvimento de competências e atitudes metacognitivas associadas à gestão e estruturação de informação, à narrativa e comunicação com recurso aos computadores e à internet.

Palavras-chave: hipermédia semântico, ensino superior, metodologias de desenvolvimento, narrativas digitais, internet

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Chapter I

1. Introduction

Traditional education and pedagogical models were developed to meet the needs of an industrial society, different from the present one. From a society based in producing material goods, there is a recognized evolution towards a society where digital media and immaterial goods are assuming a more relevant position in economical development and in the way people live and communicate. There is an increasingly recognized social and economic need to adapt education to new models that take into account this evolution. Education faces challenging times in most developed countries, as social, cultural, political and economical landscapes are being reshaped in a context of information and communication technologies (ICT) abundance (Robinson, 2010).

Several authors claim that preparing students for life-long learning should now be the major objective of formal education (Ryberg et al., 2011; Davidson & Goldberg, 2010; Jenkins, et al., 2009). These, along with many more authors, support an evolution in education toward learner-centered and active learning models, where professors and above all students can make effective use of ICT. Such wide opportunity sustains and enforces the need for further investment and research in this field (Hill 2004; Anderson & Balsamo, 2008).

This study intends to contribute to this emerging field of research by proposing, implementing and discussing a teaching and learning model that focuses on students' exploration of software and resources available online to create, share and discuss their own multimedia projects in the community. The model combines several influences of diverse authors and learning models that discuss the use of computers in the learning process (Jonassen & Reeves, 1996; Miles, 2012; Mayer, 2009; Siemens & Tittenberger, 2009). The model supports students' use of new media as cognitive tools and for the development of their own learning networks. The proposed teaching and learning model is problem-based

and students' activities are oriented toward the goal of creating an interactive video. Learning activities proposed to students are: the exploration of online resources related to a given subject; the selection of relevant online media; the development of their own media; structuring media resources with a hypermedia authoring tool; the publication of their projects online, and the discussion of each project in class.

As this thesis is developed within an emerging field many used terms are recent and still not clearly defined or commonly accepted. In this introductory chapter the social and cultural context is presented along with most the important used terminology.

1.1. Information and communication design in an increasing digital world

With the rise of digital technology, information is increasingly significant in almost every aspects of our activity. Several authors when analyzing the way people create, use, integrate, evaluate, manipulate and distribute information, claim that, economy, politics and culture is shifting society from an industrial paradigm of material production to one of *immaterial production*[1]. Frank Webster (2009) provides an analysis of the main conceptions associated to a "new information age" starting by presenting five ways of distinguishing an information society in which, data, information and ideas, are conceived as immaterial goods that can be produced, exchanged, consumed measured and quantified. Addressed conceptions are:

- technological innovation related to information and information diffusion;
- occupational change as more jobs are related with information;
- increase of economic value of ideas and information;
- increase of information flows;
- expansion of symbols and signs that drive cultural change.

However he criticizes these views as they miss showing how quantitative changes lead to a profound or systemic social change. Many authors support this idea that quantitative

[1] Immaterial production is considered all the creation and development of products based in information or knowledge and with no significant physical support.

increase of information, computers and networks, are not contributing for a shift in society but rather supporting the maintenance of essentially the same industrial hegemony (Slevin, 2000; Miles, 2012; Musso, 2013). Webster (2009) however presents theoretical knowledge increase as another factor to consider in our society. If understood "as a trend towards very much more intensified reflexivity amongst individuals as well as institutions, on the basis of which they then shape their future courses of action" (p. 455) this increase of theoretical knowledge can provide means to a most credible conception of a path towards an information society. But then again he presents this trend as recent and that still informational developments seem to be heavily influenced by familiar constraints and priorities that contribute not for change, but to continuity in what concerns social and economic arrangements.

> *"Imperatives of profit, power and control seem as predominant now as they have ever been in the history of capitalist industrialism" (ibid, p. 456)*

This discussion has been alive for many years and there is no intention to explore it here in much detail. As Harvard librarian Robert Darnton (2009) proposes, instead of accepting the notion of a new era (the information age), he argues that "every age was an age of information, each in its own way, and that information has always been unstable" (p.23). It is considered here, that more important than what kind of work is now developed, it is what kind of digital media skills and attitudes people will need to deal with information.

In this section we propose that it is not only the amount of information and people that multiplies but also the ways in which they interact and communicate with each other. These two topics are essential to contextualize the use of digital media in this work. The last topic of this section will focus on an important aspect related to the above, bringing to the discussion semantics as a key element for approaching the use of digital media in education.

1.1.1. Information "everywhere"

The word "information" is derived from the Latin *informatio* that means "outline, concept, idea", "knowledge communicated", or "act of informing" (Harper, n.d.). Inform from the Old French *informer* "instruct, teach" derives directly from Latein *informare* "to shape, form" or figuratively "train, instruct, educate" (Harper, n.d.). To explore how knowledge can be shared, it is convenient to clarify information in a more technical sense.

Information, in a restricted technical sense, is a sequence of signifiers (e.g. symbols, signs) that can be interpreted as a message. This interpretation drives from the shared meaning of these symbols or signs.

Putting the emphasis in the way information reaches even more people and in such diverse manners, Darnton proposes that we are now in the beginning of a fourth age of information, since humans learned to speak. He sets the internet in a sequence of technological breakthroughs as the development of writing, the manufacture of books, and the printing press with movable types (Darnton, 2009). His main concern is how people will make sense of the entire information overload in a global society.

> *"Information is exploding so furiously around us and information technology is changing at such a bewildering speed that we face fundamental problem: How to orient ourselves in the new landscape?" (Ibid., p.21)*

With the internet, information is "everywhere", scattered in blogs, vlogs, social networks, podcasts, e-newsletters, just to name a few online formats. Pocket size computers (e.g. smartphones, tablets, iPhones) and mobile phones allow people to photograph, to capture video and audio with high definition, to store bigger amounts of data, to manipulate it faster and to share it with others sending them to individual persons, to their communities or to everyone online. These devices became cheaper and their size allows people to carry them around and use them in their life. Most of these devices now being manufactured can connect through telecommunication networks or Wi-Fi networks to the internet. With these devices people have access to huge amounts of information and contribute to make the internet the greatest source of information ever[2]. The speed at which information travels in the internet allows sharing hours of high quality video in minutes. Video conference systems allow people to talk with others across the globe in real time with high definition image and sound[3]. This technological evolution associated with information and communication has been

[2] The internet now surpasses all paper written information by several hundred times. Some estimates vary defining the amount of available online data in 2013 to be about 3.000 exabytes (IDC Digital Universe study http://www.emc.com/leadership/digital-universe/index.htm). One exabite is 10006 bytes (1 billion gigabytes) http://en.wikipedia.org/wiki/Exabyte).

[3] High-definition video is assumed to have an image resolution with 720 scan lines or more. Most online video calling services offer this resolution and audio can be up to 48kHz full band quality. Specific dedicated video conference systems can offer higher resolutions of three streams of video with 1080 scan lines and 48 kHz full band audio.

considered by many authors as a key element for social progress and economical development by bringing efficiency to all processes and making the world a "global village" (McLuhan, 1962; Bell, 1973; Druker, 1969). Already in 1954, Wiener wrote "to live effectively is to live with adequate information" (Wiener, 1988, p.18). Also in more recent years authors as Manuel Castells (1996, 1997, 1998) present a techno-utopia based in the internet. He presents the internet as "a technology of freedom" providing the technical and material infrastructure to the whole social fabric, claiming the internet "provides the material basis for these [bottom-up social] movements to engage in the production of a new society" (Castells, 2001). This stance has been criticized by several authors and classified as a modern version of "technological determinism" with a narrow economical perspective (Wolton, 1999; Slevin, 2000; Musso, 2013). Nevertheless it supports a mainstream vision that has been extensively adopted by international organizations and countries in the definition of their policies toward development in last years. This mainstream vision tends to consider ICT as a "magical" ingredient toward competitiveness. It supports not only the spread of the ICT infrastructures in several countries, but also supports the introduction in schools of equipments. In the case of Portugal a governmental program[4] supported the purchase of personal laptops and internet services for students (Pereira, 2011). The partial or limited success of this program seems to be justified with lack of digital media skills and attitudes to make good uses of the acquired equipments and software in pedagogically integrated ways. An OECD recent report on adult skills provides a picture that in most countries information-processing skills are lacking. There seems to be now a vision that these skills are indeed needed to help people "weather the uncertainties of a rapid changing labour market" (OECD, 2013b, p.46).

Another approach proposed by UNESCO (2005) in its World Report entitled "Towards Knowledge Societies", seems to question this predominant narrative concerning *information society*. In the report it is argued that there is no readymade, off-the-shelf model, which can be adopted to ensure ICTs are developed and used in enabling ways. The development of *knowledge societies* shifts the concerns about ICT into human and sustainable development goals, focusing in social, ethical and political dimensions considered

[4] Programa E.Escola was a Portuguese governmental program that, from 2007 to 2011, distributed to students more than one million, three hundred and fifty thousand portable computers.

essential by some authors in order to rethink challenges in education and research frameworks (Mansell, 2009).

The title of this topic, "Information everywhere" is however also a provocation. Although so much information is available online and the technology makes it so cheap and easy to access, the truth is that most people in the world are still far from having real access[5]. While in some developed countries the internet may reach 90% of their population and most of it with broadband connection[6], large populated regions of the planet are not covered by internet network at all[7].This shows that the digital separation in the access to the internet is still an issue far from being solved. These divisions occur between countries but also occur inside countries. Also in developed countries great asymmetries still exist between people living in remote or rural locations and in pockets of urban areas with economically marginalized populations (Mitra, 2008; Norris, 2001).

But the problem of the digital divide has not only to do with access issues, but there is also an increased concern associated with the skills needed to benefit from technologies. According to several reports in diverse countries the statistics presented to us show that there is still a great deal of work to do in what concerns digital literacy. In Portugal 9% of the population is illiterate, and 16% is considered to be functionally illiterate (Instituto Nacional de Estatística, 2004). In the last OECD (2013b) report on adult skills, 9% was the average of adults with no functional literacy skills and 27% was the average of adults with no functional skills to deal with computers or an internet browser[8]. Using the internet and computers efficiently, requires people to have a large set of skills. People should be able to search, to

[5] Most recent studies estimate that only 39% of the world population has access to the internet.

[6] Broadband internet generally refers to connection made by cable that allow more than one connection with different frequencies and allowing data transmission faster than dial-up connections (regular telephone line) that have transmission rates up to 56 kbt/s. Regular speed broadband services may vary between 2 to 10 Mbit/s. More than 10Mbit/s may be called high broadband connection speeds. Telecomunications network used for voice service in mobile devices can also provide internet at high data ranges (Fourth generation with data rates up to 100 Mbit/s or more).

[7] Large regions of the planet including entire countries (ITU, 2013) don't have internet and in some countries the number of users although being low are even dropping (http://www.internetworldstats.com/). This generally is associated with govern censorship of these services and with the extreme poverty of the populations. Land connections (dial-up and broadband connections are few in most developing countries (less than 6% in sub-Saharan countries). But mobile connection services are spreading in these countries. International Telecommunication Union (ITU) estimates that in 2011 only 10% of the world population lived in areas not covered by a 2G mobile connection (2nd Generation – speeds that can go up to 19kbit/s) most of them in Africa (ITU, 2013). The average penetration in all sub-Saharan countries is estimated at 11% (mostly dial up connections or with lower speeds) (ITU, 2013).

[8] Percentages relative to the average of countries participating in the study.

interpret information, to judge the quality of the information, and to verify the contents' authenticity. The way information is presented and shared in the internet has particular differences when compared to the way most people are used to consume information in first hand or in the traditional media. Although the adoption of ICT in education is considered to be increasing, there are still great disparities in its diffusion contributing for the existing rates of digital illiteracy (Norris, 2001). According to the OECD (2013b) report only a minority of the population (5,8%) has the ability to perform tasks that "may require evaluation of relevance and reliability of information in order to discard distraction" (p.88).

In this research study we agree, together with many authors and researchers in the field, that rather than opposing or supporting unconditionally the use of information and communication media it is fundamental that schools help the development of a critical consciousness in students (Correia & Tomé, 2001; Wessels, 2010), and that literacy objectives should be focused in capacities and skills to allow lifelong learning. Society and education institutions have an increased responsibility in the promotion of inclusive digital literacy programs that should support effective teaching and learning of the needed digital skills (Wessels, 2010).

Before discussing these skills it is highly convenient to present the internet as an evolving environment where information and services are not fixed but rather in constant update and upgrade. Consequently teaching and research models developed ten years ago may be already unadjusted as contexts are shifting all over the world.

1.1.2. Social network mediation

As relevant as the amount of information and the amount of people's networks that are now part of the internet it is important to consider the way people are connected to each other and how they share information. Besides using previous technology as e-mails and blogs to share information, people are now using social networks. In 2013, almost three quarters (72%) of online adults (in USA) use social networking sites (Brenner & Smith, 2013). Also young people are becoming highly participative changing from a passive consumer stance to a rather active one. According to a Pew Internet & American Life project (Lenhardt et al., 2005), one-half of all teenagers in the USA were considered content creators. An OECD study revealed that 30% of students using computers at home for leisure at least

once a week claim that they publish and maintain a personal website or blog. The study reported that of these frequent users, 45% participate in online forums and virtual communities or spaces (OECD, 2011). The internet is becoming a huge social mediated network where a participatory culture is rising. The great development of social networking began about 10 years ago with multiple communities spreading all over the internet[9]. Services that take into account users' value both as viewers and as participants emerged and begun to attract attention. Several companies provided open online communities where people could express themselves, create blogs, edit web pages, develop their own profile, discuss in forums and other online collaboration environments. People can make their content and ideas available to millions without requiring producers or editors. A small project done in a couple of days by one person with a small laptop can attract more online audiences than projects developed with millions of dollars by professional production teams[10]. Collaborative projects, done by volunteers, like *Wikipedia*, challenge the reputation of traditionally implemented encyclopedias, like *Britannica* (Messener & DiStaso, 2013).

People contribute to give value to the internet with their participation in many ways. The way to calculate the value of sites is associated with the number of views and clicks generated in the web pages or communities they participate in. These will be the statistics that most advertizing companies will be looking for, in order to attribute a monetary value to an ad in that site. Sites like *Facebook*, *YouTube* and *Pinterest*, where people are sharing personal pictures with their friends, commenting the movie they saw yesterday, or posting videos, are among the most used sites[11]. In this way, online people are never considered only merely as consumers but also as producers (Bruns, 2007).

The *Web 2.0*, the term popularized by Tim O'Reilly in 2004, is the "network as platform" where sites, services and online applications get better as more people use them, "consuming and remixing data" (2006). The interface design and system architecture is

[9] *Hi5*, *LinkedIn* and *Facebook*, two of the biggest social network sites were created in 2003. In 2003, *Blogger* (Sites for free blog publishing since 1999) changed its policies to allow earlier charged premium features to be used for free. *Facebook* ranks the second most used site in the whole internet. Between March of 2011 and March 2012 the number of users increased by 171 millions (http://www.internetworldstats.com). By October 2012 the founder Mark Zuckerberg confirms that it reached one million active users a month (Kiss, 2012).

[10] One example can be the video by Michael Wesch done with his class of anthropology published four days before a Super Bowl and it resisted to the usual viral videos of Super Bowl commercials ranking number one in *Technoraty* for at least two days (http://www.youtube.com/watch?v=TPAO-lZ4_hU).

[11] Site with a ranking of most visited sites in the internet (http://www.alexa.com/topsites).

becoming more intuitive and easy to use in order to attract more users and facilitate participation. Also the servers where these services are running have increased in processing capacity allowing people not only to create their own sites full of rich media, but store, edit and share written documents, presentations and videos using the servers' computing capacities[12]. The internet is evolving and the term *Web 2.0* reflects an evolution from a previous *Web 1.0*. Before *Web 2.0* what was available online was developed by programmers and web designers in a logic of institutions and companies managing and delivering contents and information to people to consume online, whereas in *Web 2.0* people develop and share their own materials and information. The logic is now less one-to-many and more, many-to-many.

Many studies show that people are more likely to trust someone they know or with whom they are emotionally connected than with strangers. Advertisements that make people share them with their friends become viral and are the most likely to influence peoples' choices in the future. A similar psychological effect has been studied in the field of education by renowned authors since Vygotsky in the beginning of the last century (Tudge & Winterhoff, 1993). People learn more with others if there is an emotional bound that connects them (Johnson & Johnson, 1999). This is one of the bases of social cognitive theories based in research done in face-to-face learning environments that are now being explored at different scales with *Web 2.0* based learning environments (Bertrand, 1995). Anthropologist Michael Wesch explains how the development of social networks can be of great relevance to education. In his presentation at Manitoba University[13], he emphasizes that learning, as creating meaningful connections, requires not only semantics (how words, concepts and ideas relate to each others), but also social engagement. To create meaning, the person's own identity is highly relevant and it is not just defined by "who they are" "but in how they relate, connect and contrast with other people".

The way people use computers and the internet is changing. The desktop metaphor for the initial screen of computer's interface, still used today, is a metaphor brought from the pre-digital age when people were used to see information as something one could put on paper and

[12] *Prezi* - site for creating and sharing dynamic presentations (http://prezi.com); *Popaton* - online application to develop interactive videos (https://popcorn.webmaker.org).
[13] *A Portal to Media Literacy,* Michael Wesch's presentation at University of Manitoba (http://www.youtube.com/watch?v=J4yApagnr0s)

organize in files inside folders. As Wesch (2008) says that is a metaphor of the past:

> *"We are only just now beginning to recognize that putting things in files inside folders may not be the best way to organize digital information, that there are now new possibilities for the organization of information."*

In the *Web 2.0*, information can be distributed through communities that share it and discuss it. In the digital age, digital media can be categorized and accessed in multiple ways. It can be virtually in more than one place, and it can be organized according to the meaning it may have in each context or community. As we will see in the next topic, metadata associated to digital media can be of great help to contextualize it.

1.1.3. The Social Semantic Web and Hypermedia

The term *semantic web* was coined by Tim Berners-Lee in 2001 to describe the needed evolution of the *World Wide Web* (WWW) from a network connecting documents for humans to read to a network that would include metadata to facilitate computers to process information in online resources. The purpose of this evolution was to allow computers or "intelligent agents" (programs with *artificial intelligence*) to *interpret* human language and provide answers to people's questions. This would be of extreme value to integrate big data sets of scientific information but also for anybody searching the web. Users asking questions online instead of having to browse through a list of sites, created by a regular search engine would have one comprehensive answer[14]. To make this evolution, information and metadata in web pages and online resources would need to comply with a defined set of syntax and semantic structuring standards[15]. Community-led organizations began defining the needed rules and anthologies[16], but by 2006, Berners-Lee, Nigel Shadbolt and Wendy Hall considered that this shift was "largely unrealized" (Shadbolt et al., 2006). The discussion and adoption of the needed interoperability standards in each field of information production seem to be taking too long. Yet the definition of interoperability standards is not the only way in which the internet is evolving toward a

[14] Some sites and application can do that but are still not able to reply to all request (e.g. http://www.sensebot.net; http://www.wolframalpha.com/)
[15] This set of standards may also be called ontologies.
[16] Organization that propose standard ontologies for web page development are the WWW Consortium (http://www.w3.org/) and the Internet Engineering Task Force (http://www.ietf.org/)

semantic web.

Interoperability standards are of great benefit in the area of education (Jovanović, et al., 2007). Although in the last decade there has been an increased effort from education institutions and content production industries to create learning objects[17] (LOs) interoperability standards for content based training[18] (CBT) there are still too many different standards and content production that does not comply with an overarching norm. The IMS Global Learning Consortium is probably the most well-known organization in the field working to provide the organization and distribution standards for creating complete digital learning resources in packages that can work in multiple learning management systems (LMS), the *Common Cartridge*. These packages include not only LOs, but complete sets of instructional resources that may include applications, quizzes and a set of procedures to be used by the professor in his course. SCORM (Sharable Content Object Reference Model) is also an interoperability standard but more directed to the development of much individualized LOs. SCORM specifications for LOs allow them to be shared in multiple courses and LMSs keeping the defined implementation structure and the defined instructional design. These standards are mostly designed to provide what is called *self-paced learning* where students follow their own rhythm of study following screens of information and multiple choice quizzes to allow progression. In the case of *Common Cartridge* assessment can be managed not only with quizzes but sets of activities and professors orientation. The development of these learning packages is generally done by a team of professionals, as the idea is to carefully plan the instructional design accordingly to specific learning objectives. Nevertheless, these standards mainly imply that these hypermedia objects have the content structured in a tree-like structure with few options for students to follow their own path. Also, most LOs being developed until now follow traditional hyperlink based structures. These structures seem to be unadjusted to some areas of study and CBT effectiveness for developing skills is in fact questioned for most learning scenarios.

Most higher education institutions that have an institutional LMS don't integrate CBT

[17] Learning Objects are generally defined as being digital educational resources that can be employed in technology-supported learning. They can be described with metadata and become modular units to be assembled together to form lessons and courses. They can be an electronic text, a simulation, a Web site, a graphic image a movie, etc.

[18] Content based training is the term here used to address training and learning developed mainly using lessons or courses built with learning objects.

in their courses or if they do, they don't follow any particular implementation standards. If a professor feels the need of providing additional personalized contents they produce them by themselves using regular authoring tools as word document editors or presentation applications and then simply share them with students, uploading them to a content management system (CMS) or to the institutional LMS. In this manner both professors and institution avoid expensive intermediaries to build sophisticated content.

In what concerns CBT it seems that most successful projects are those that propose less rigid structures and that are mainly developed in informal learning environments. *YouTube* for instance is the home for many educational materials and even massive scale learning projects. *The Khan Academy* may be the most famous video-based learning project with over one million school children accessing its videos for doing math exercises, learning science and history (www.khanacademy.org).

Less rigid hypermedia formats, as databases, have been explored in several research projects in education and with results considered good and promising (Brusilovsky, 2001; Yoshihiro & Hirata, 2009). Already in the 80's many authors considered that database structures could be more adaptable to support the presentation of complex issues allowing students more freedom for exploration and providing open-ended environments where students are encouraged to thing by themselves (Spiro, et al., 1988). Many formats were developed but most educational projects using database systems developed before 2000, were based not in providing many options to the learner but rather making choices for the learner based in their characteristics and environment (Brusilovsky, 2001). The designation for learning objects in these projects was *adaptive hypermedia*. These projects and learning solutions were nevertheless developed in the logic of having a team of programmers, designers and instructional designers working with professors to develop resources for students. They can still be considered as based in top-down logic that is not adjusted to the online bottom-up model associated with the *Web 2.0* (Brusilovsky & Henze, 2007).

In *Web 2.0*, although in a much less organized ways than envisioned by Berners-Lee, the internet is becoming more meaningful as people willingly generate metadata, along with the content they share or content they identify, for later use or for others to use. People tagging and describing web pages and media within categories allow computers to process these contents in

order to integrate them in answers to peoples' online questions. Carlo Torniai, et al. (2008) propose the term *Social Semantic Web* as this new paradigm for creating, sharing and combining the technologies and approaches from the *Web 2.0* and the *semantic web*. One example of how social participation is contributing to the *semantic web* is the identification of certain types of media. While computers still have much difficulty in the interpretation of images, video and sounds, humans can do that with considerable more proficiency. When describing media elements with tags, a regular user can be facilitating searches related to the content of that media (Jiang at al. 2009). This process of adding tags and distributing diverse media through categories provides the internet with what is now called "folksonomies". While less structured than the well defined ontology, prepared by specialists in each field, it allows search engines (or Berners-Lee's "intelligent agents") to retrieve these kinds of resources to users as they search or browse the internet using keywords or making questions.

YouTube, one of the most famous video-sharing sites, illustrates how these bottom-up logic works. Anyone uploading a video, besides adding a title to it, is invited to make a brief description, to add tags and add it to a category. Categories may be defined by *YouTube*, but tags can be entirely defined by the user, and the most used tags associated with the category or title may be suggested. These metadata will be useful for *YouTube* or *Google* to find the uploaded video and retrieve it in a list when associated keywords are searched. This video will also be proposed by *YouTube* whenever users are browsing for videos semantically related to this one. In other words, when a user is visualizing a video, *YouTube*, based on an algorithm that considers videos' metadata chooses videos with similar metadata to the one he or she is seeing. The idea is something like: *If you like this video, you will probably also like these ones that are similar.* This type of organization of media in databases allows forms of navigation based in a *semantic web*. In this work we will call these formats *semantic hypermedia*. If hypermedia is defined as a set of connected media elements that are navigable by the user, *semantic hypermedia* is a type of hypermedia where media elements connections are based in meaningful relations established between each media and not by hyperlinks. This format is increasingly being adopted in many cultural and artistic projects (Anderson, 2004). One early example can be the project developed in the commemoration of the life of Jerome B. Wiesner. The name of the project is "Jerome B. Wiesner: A Random Walk through the Twentieth

Century"[19]. It presents viewers with a dynamic graphical interface that supports browsing based on association developed with the application *Dexter* (link not available).

Although well accepted and extensively used online, these formats of hypermedia are only now starting to be explored. Manovich (2013) observed that "the revolution of the means of production, distribution, and access of media has not been accompanied by a similar revolution in the development of media syntax and semantics." (p.56). Exploring these new media formats is supported by practitioners and researcher in the field of education for many reasons. On one hand, while using semantic formats students are preparing themselves to participate and contribute to the evolution of the *semantic web* (Ohler, 2008) but also it is envisioned as a way to foster collaborative activities (Torniai, et al., 2008).

> *"(T)he Semantic Web is far enough into the future that we can actually help shape it. Educators would do themselves, students, and the world a tremendous favor by jumping into the discussion now and helping Web 3.0 developers realize a vision that recognizes education and promotes the public good as top priorities." (Ohler, 2008, p.9)*

> *"The Social Semantic Web paradigm can play a crucial role in the context of e-learning: on one hand, facilitating a larger adoption of ontology-based elearning systems (overcoming the difficulties related to domain ontologies creation and update) and on the other hand, providing enhanced feedback based on collaborative activities." (Torniai, et al., 2008, p.389).*

1.2. New ways of using digital media in higher education

As we will further discuss, digital media assume diverse formats and forms of distribution of digital content that may be text, sounds and images or the fusion of all of them that we will call here multimedia. Computers and digital software allow users the capability of being both consumer and producer of information. In this way digital media are associated with ways and formats to create, distribute and consume information that can only be done using digital devices and digital formats instead of traditional analog formats as print or broadcast. In media studies, digital media are as well commonly discussed in contrast to previous traditional mass media where information was not bidirectional and mainly flowed from one to many.

[19] Project web page: http://xenia.media.mit.edu/~murtaugh/thesis/Dexter/Dexter.html

Associated with the topics discussed in the previous section there is much discussion about the emergence of a "new" digital media culture. Along with this discussion many authors address the need of promoting digital literacy and media literacy in society in all levels of education. This study however will focus only on higher education. When describing media literacy most authors include digital literacy associated to digital technical skills. In this work, to accentuate specific different soft skills associated with the digital aspects of media, when speaking in media literacy we will use the term digital media. Most recent literature on the use of ICT in education focuses in the need of preparing students for a "new" set of skills and attitudes for the 21st Century and the need for meeting students where they are now (Jenkins et. al. 2009; Borgman et al., 2008).

> *"Investments must be made now, while a new generation of learners can be reached where they are now — their lives deeply entwined with communications technologies—before they diverge yet further from today's educational methods." (Borgman et al., 2008)*

E-learning is the term commonly used to refer to the use of ICT in education. The use of e-learning in higher education has been increasing and not only in distance education institutions but also in campus-based universities. There is a recognized interest in the research of e-learning in the context of distance learning, but it does not reflect the reported increased use of e-learning in face-to-face contexts.

The search for "new" ways of teaching and learning are generally associated with the use of "new" technologies. Referring to the use of digital gaming, simulations and social networking, Eric Klopfer et al. (2009) have stated that "these technologies afford us the ability to convey concepts in new ways that would otherwise not be possible, efficient, or effective with other instructional methods" (2009, p.4,). In other words technologies not only can be helpful to teach old things in a new way but also allow professors to teach new things that may be of help in the near future.

Computers and the internet brought in fact new possibilities for people to use media with considerable differences to what was possible with traditional formats of previous media as analog video, audio and printed materials. These new possibilities have to do with interactivity, reusability and the ease to share resources with others. To what concerns interactivity, digital video or audio formats allow people to control with much ease and

precision what to see/hear and when to access it. Not only the user can stop, pause or fast-forward it as in the VHS (analogical) format but can easily jump to a precise minute or second automatically. In hypertext the user can interact with the words he or she is reading and use hyperlinked words to navigate through the content. A digital media artifact is reusable as it allows users to make adaptations to use the same material in different contexts with small changes or by remixing with other content. To what concerns sharing possibilities, digital media formats allow copies to be distributed or shared online and used multiple times without any damage to the original.

Most of the skills to deal with this new paradigm are still left out of schools and universities. This fact makes several authors show their concerns on developing skills for critical thinking and for collaborative and cooperative work (Davidson & Goldberg, 2010; Jenkins, et al., 2009). Authors as Rosado & Almeida (2005) state that most of school activity is centered in teaching and learning activities that were optimized to train students to a certain limited number of intellectual tasks, oriented toward the transmission of theories and principles and valuing mnemonic and deductive processes in an environment of controlled variables. Davidson & Goldberg (2010) state that these learning activities are based in methods well suited to the standardized, top-down factory or corporate model of an *industrial age* that is completely unadjusted to our societies.

> *"Whenever I speak before large gatherings of corporate trainers, they tell me they can recruit anyone now, in this economy; the very best students from the very best universities. And they are dismayed that it takes a minimum of one to two years to retrain them from being 'great students' to being 'great colleagues'. These new employees are so used to getting the perfect score on the test at the end of the course that they themselves do not know how to self-correct or how to take mid-course correction from others. They have had 16 years of an education in choosing the best from among four answers to simplistic questions, capable of being answered in only one way. Not a lot of life works that way. (Davidson, 2012)*

1.2.1 Education for a post-industrial society

The *Grunwald Declaration on Media Education* issued unanimously by the representatives of 19 nations at UNESCO's 1982 *International Symposium on Media Education* presents the need to prepare "young people for living in a world of powerful

images, words and sounds where media are omnipresent".

> *"Rather than condemn or endorse the undoubted power of the media, we need to accept their significant impact and penetration throughout the world as an established fact, and also appreciate their importance as an element of culture in today's world. The role of communication and media in the process of development should not be underestimated, nor the function of media as instruments for the citizen's active participation in society. Political and educational systems need to recognize their obligations to promote in their citizens a critical understanding of the phenomena of communication." (UNESCO, 1982)*

Along with other claims the declaration sustains the need for competent authorities to:

> *"… initiate and support comprehensive media education programs - from pre-school to university level, and in adult education - the purpose of which is to develop the knowledge, skills and attitudes which will encourage the growth of critical awareness and, consequently, of greater competence among the users of electronic and print media. Ideally, such programs should include the analysis of media products, the use of media as means of creative expression, and effective use of and participation in available media channels;" (Ibid.)*

The importance of innovation in higher education, we believe, should drive from the challenge of promoting inclusive media education programs that may answer to this idealized view in the actual context of universities where they are implemented. Jenkins et al. (2009), almost 30 years passed of this declaration, accentuates the importance of promoting participation in a culture where average consumers have now more opportunities to have an active stance.

> *"Participatory culture is emerging as the culture absorbs and responds to the explosion of new media technologies that make it possible for average consumers to archive, annotate, appropriate, and recirculate media content in powerful new ways." (Jenkins, et al., 2009, P.8)*

Innovation and research in the field of media education has nevertheless lead to controversial debates between what Buckingham (2008) and other authors claim to be the mainstream deterministic view of technology, that considers that technology is somehow emerging "from a neutral process of scientific research and development" and those that consider it emerging "from the interplay of complex social, economic, and political forces"

(Buckingham, 2008). This mainstream view associated with another form of determinism, "information determinism" where information is seen as a "neutral good", leads to conclude that more access to information will be essentially beneficial for learning. This "transcendental" view of technology and of information has been widely challenged by many authors as Kevin Robins and Frank Webster (Buckingham, 2008). Buckingham (2008) however points out the danger of the extreme opposite view "the notion that technology is somehow entirely shaped by existing social relations" (p.12). This approach sees technology "as simply a matter of what people choose to make of it" and in consequence "it has no inherent qualities and is regarded as essentially value free" (Ibid, p.12).

In this work we assume that some technologies have their inherent potentials and can be better than others for specific purposes. Choosing the technologies, the purposes and the conditions in which to use these technologies should be a concern of social institutions, schools, universities, professors and researchers. These options should be considered determinant to influence ways in which technology and technology uses may evolve in society. But using technology in education does not only concern supporting technical skills. Most authors are indeed more concerned with critical thinking skills about mass media or digital media as they argue that generally people don't acquire them just by using technology tools themselves (Hobbs, 2010). People can have the technical skills to use Facebook or publish in blogs for a long time but can be far from understanding the implications associated to their activity at a global scale and may be far from having the skills needed to search for relevant information for their lives as educational resources, job offers or health care. Having computers and internet connection in universities is not enough for changing teaching and learning practices. Several reports show that most professors mistake the mere transfer of classroom materials from paper to a computer screen as effective use of technology. Several reports and studies show limited use in schools and universities of advanced tools and practices with ICT (Furber, 2012; Moore, 2008; Tornero; 2004; U.S. Department of Education, 2010). Most activities seem to focus on preparing students to write documents or to make *PowerPoint* presentations along with other simple skills.

Technological activities should be oriented according to defined learning objectives and relate to students' possible uses of technologies outside of the class. Adrian Miles (2012),

professor at RMIT in media studies, sustains that a professor's role in a college level course, should be to prepare students to think by themselves and be able to be creative and adaptable to shifting producing scenarios. In his book, "Post-industrial education?" he maps the media production field as becoming increasingly unstable due to the dissolution of industrial paradigm supporting conditions. Miles claims that commercial media companies, although concerned with intellectual property and knowledge work, are still closer to traditional industrial companies than what would be expected. They are more in the business of producing and selling goods (programs and audience aggregation) than in the business of producing theoretical knowledge or contribute to an information based society as envisioned by Daniel Bell (1976, p. 45). Miles makes clear that, in what concerns information, the logics of scarcity that ruled the twentieth century media production is no longer sustainable.

> *"To make media in the twentieth century outside of the domain of the personal, required access to scarce resources. They were scarce because they were expensive. (…) It is to state the obvious that the economies of scarcity that underwrote industrial media are gone. What a media project costs is now in so many ways an optional decision." (Miles, 2011, pp. 8-9).*

Also Andrew Blau (2004) envisions a change in the ways media will be made and consumed, independently of the traditional corporate sponsors.

> *"The media landscape will be reshaped by the bottom-up energy of media created by amateurs and hobbyists as a matter of course. The resulting output will overrun the institutions and strategies created to organize and navigate an era of great scarcity of media equipment and products. This bottom-up energy will generate enormous creativity, but it will also tear apart some of the categories that organize the lives and work of media makers." (p. 3)*

Some rules that still provide support to the current industrial media production are fragile. Most of what is being consumed and sold in the media and entertainment business is distributed in digital formats almost not depending in the transaction of material goods. The revenues in USA movie industry for instance are much affected by a significant decrease in DVD or Blu-Ray sales in the last decade[20], reportedly because of illegal

[20] Summary report over US Movie Industry revenues from web site *Information is Beautiful*: http://www.informationisbeautiful.net/2012/how-much-does-hollywood-earn/

downloads[21] and digital distribution. In much articles and press releases piracy is cited as a number one concern of the movie industry (Tryon, 2009). The traditional industrial paradigm where production costs where highly dependent in big expensive machinery and expensive consumables is fading away as making films, TV programs or computer videogames requires near to zero costs in terms of production and distribution. At the same time the popular mediated internet is overriding the industrial hegemony that informed, defined a media agenda and legitimated content and information. As Miles (2012) puts it:

> *"Here (and now) media making, distribution, and use is about relations between people, technologies, protocols and things, rather than audiences and programming." (p.2)*

Authors as Alex Bruns (2007) state that media is no longer produced. He proposes "produsage" as the term to identify the way media is at the same time produced and used.

> *"The increasing prevalence of user-led content production especially in online environments from the Wikipedia to open news publications and open source software development communities is indicative of an ongoing paradigm shift from industrial-style content production to what is here described as produsage: the collaborative, iterative, and user-led production of content by participants in a hybrid user-producer, or produser role."*

Lawrence Lessig (2008) also addresses the ongoing shift from big media production industry to participatory ways of production. He explores the cultural, economic and legal shifts toward a future more open to what he call a *remix culture*. In his book "Remix" he shows his concern about the influence, in young people, of what he claims to be a war between those with interests in a commercial economy and those supporting a sharing economy.

> *"Now I worry about the effect this war is having upon our kids. What is this war doing to them? What is it making them? How is it changing how they think about normal, right-thinking behavior? What does it mean to a society when a whole generation is raised as criminals?" (Lessig, 2008, p.xvii)*

Addressing the need to rethink the laws that govern copyright he presents many examples from African oral cultures, to the artistic creative processes to the basis of the internet code. He sustains for instance the need to allow easy ways to recognize and use digital media through "noncommercial" licensing as for instance the *Creative Commons* project.

[21] *Content Protection FAQs* web page of Motion Picture Association of America: http://www.mpaa.org/contentprotection/faq

Following a research study based in the observation and participation in the *YouTube* online video sharing community, Wesch, says that "Most of YouTube videos are meant to be viewed by less than 100 viewers" [22]. He claims that most people are creating videos for a very close group of people to see. Eventually some of these videos can get viral and spread all over the internet but that is not what drives people to publish. This logic of production that is often based in remixing others material is much different from the one of major traditional mass media companies that nonetheless still impose their production and distribution over the large WWW and still have great impact in the agenda setting[23]. Peer-reviewed journals from commercial publisher are still main references in many academic and scientific fields however, open access journals and platforms seem to surpass with growing impact on some researchers communities (Anderson, 2006; Antelman, 2004). According to Miles (2012):

> *"The industrial [model] will not melt away – but it will have to accommodate being pushed aside to share a public media sphere that has been turned upside down" (p. 9)*

Interactive media is one of the most relevant transformation in the entertainment industry. The way interactivity is penetrating the media and entertainment industry is still contributing to innovation in the field and being able to attract more public. The two latest largest commercial success in the entertainment industry were two video games which surpassed $1 billion sales in less than two weeks[24].

To what concerns participation, games or game like environments, are leading the field evolution as several companies develop business models, which include users as developers of their fictional worlds. The most paradigmatic example would be the virtual world of *Second Life*[25]. A 3D world where people customize their characters, buy virtual land and "program" their houses. The game industry, or formally, *interactive entertainment industry*, is now the most emergent industry with high increases in both sales and revenues. Video games also penetrate people's lives in different ways. People can play in diverse situations, from the bus

[22] Michael Wesch's presentation "An anthropological introduction to YouTube" (http://www.youtube.com/watch?v=TPAO-lZ4_hU)
[23] Agenda setting is the ability of media to influence the salience of topics in the public debate.
[24] *Grand Theft Auto V* and *Call of Duty: Black Ops II* took one and two weeks to make $1 billion worldwide ("Grand Theft Auto V", n.d). The top selling movies ever, *Avatar* and *Harry Potter and the Deathly Hallows – Part 2* , took 19 days to reach $1 billion in the box office sales ("Harry Potter and the Deathly Hallows – Part 2", n.d.).
[25] *Second Life* web page: http://secondlife.com/

station to the office or the living room. People can play alone or in groups or in massive online gatherings with thousands of people sharing the same virtual environment[26]. With this close competition of video games since the 80s, traditional movie industry has been investing in new production formats. Most big companies invested in video game production entering the business of interactive entertainment. Since the late 90s several companies also began investing in what is now called transmedia storytelling formats. This consists in releasing a movie along with different media formats that complement or extend the story (e.g. comic books, web-pages, video games). The number of hours people spend playing games is also competing with hours spend in front of the TV or listening to music (Watkins, 2009). As Jane McGonigal stated in a TED conference[27], several reports show that most young adults spend more time playing videogames than in school class.

> *"The average young person racks up 10,000 hours of gaming by the age of 21 - or 24 hours less than they spend in a classroom for all of middle and high school if they have perfect attendance. It's a remarkable amount of time we're investing in games. 5 million gamers in the U.S., in fact, are spending more than 40 hours a week playing games - the equivalent of a full time job!" (TED, 2010)*

Jane McGonigal (2011) in her book "Reality is Broken" analysis the importance of video games in the development of several important skills in gamers. In the USA more than 50% of professors (k-12 and pre-k) value the use of games, interactive simulations and web-based activities. In the same study, 97% of teachers say they use digital media in class and 62% report this use to be frequent (PBS, 2011). Most of the exploration of media resources is used as an introduction to a theme, for instance as a teaser. And this tradition is widely supported by educators and researcher community. The authors David W. Johnson and Roger T. Johnson (1999) state that one of the most powerful and important instructional tools is intellectual conflict, which can be easily triggered with short videos. The authors consider activities that deal with academic controversies, as the most advanced cooperative learning activities and that the form of cooperation generated supports and strengthens the most important social skills.

[26] Some *massively multiplayer online games* (MMOGs) claim to have more than 50.000 people playing in one single online game. But some popular games claim to have more than 23 million user logged in each day ("Massively multiplayer online games", n.d.).
[27] TED (Technology, Entertainment, Design) conferences are hold annually in US. In 2011 Jane McGoningal made a talk under the title "Gaming can make a better world".

"To learn is not to acquire information. To learn is to discuss/challenge/critique/share/create information. To learn is to create meaningful connections/significance" (Wesch, 2008)

1.2.2 One further step in hypermedia development: sequential semantics

Several years before the *World Wide Web* was created the term *hypertext, hypermedia* and *hyperfilm* were first used by Ted Nelson (1965) that described a way to organize media and information in digital format escaping the limitations of paper. The file format proposed would allow creating text along with multiple links to different sources and media formats. The idealized format was not adopted and instead the first text editors followed the paper metaphor and limitations. Ted Nelson coined the terms but the idea for these new media formats was already in the words of Vannevar Bush when in 1945 he criticizes the way the information was artificially indexed in encyclopedias or libraries alphabetically or numerically.

"The human mind does not work that way. It operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain."(Bush, 1945, part 6, para.2)

José A. Mourão (2001) notes that also before these authors many others already explored a return to forms of writing that could allow many ways of reading.

"Hypertext writing allows a return to an immense tradition that tends to express the non-linear, the overlay of life, the profusion of the real, the magic of the hidden, beyond the stiff of the print. Pessanha of the liquid consonants, the calligrams of Appolinaire, Joyce, Proust, the Surrealists and many more "modern" authors walked hand in hand with the oral literature, with the mysteries of middle age, the Iliad and the Bible."[28] *(Mourão, 2001)*

Randal Packer and Ken Jordan (2001) propose that the origins of multimedia discussion can be traced back in literature even further to the theories of the nineteenth-century German composer Richard Wagner (1849) as he proposes the concept of the "Gesamtkunstwerk" ("Total Artwork") as a unification and integration of all art forms. This idea, to fully immerse the audience through the use of music, song, dance, poetry, visual arts and stage craft, was followed in the idealization of his operas. Full immersion of the audience through the use of diverse art forms in the Italian operas of the seventeenth century had already its origins in the

[28] Translated from Portuguese by the author.

ancient Greek theater. The futurists in the beginning of the twentieth-century with artist like F.T. Marinetti reframed these ideas of integration an immersion for cinema. In 1916 Marinetti and others declared, in the "The Futurist Cinema" manifesto, that film was the supreme art because it embraced all other art forms. The idea of interactivity also presented as central in multimedia by Packer and Jordan (2001) was somehow already present in futurist and surrealist ideas but they suggest Lazlo Moholy-Nagy (1924), one of the most prominent artist from the Bauhaus movement, as the first emphasizing this aspect in what he called a *theater of totality*. This art form should aim for a full range of human experience valorizing formal components of theater as space, composition, motion, sound, movement, and light and aim to eliminate the stage and spectator separation. In this *theater of totality* creative relationships and reciprocal tensions should be produced between actors and audience. This traditional boundary between artwork and audience is also deconstructed by John Cage and his performance work since the late forties. Also bringing together music and theatrical performances Cage introduced random operations in musical composition and other techniques to shift the responsibility for the outcome of the work away from the artist to the audience. Compositions such as " 4'33"" transform the audience into participants, the context as the main subject as the interpreter by the piano does not play any key and the audience only listens to sounds that are generally considered in theaters to be noise during performance (Daniel, 2011). Many artist since the late fifties like Allan Kaprow, Richard Higgins, and Nam June Paik inspired by Cage developed nontraditional performance techniques that lead to new genres like the *Happening*, *performance art*, and interactive installations. In late sixties art, technology and computers became increasingly integrated as artists and engineers started working together in collaboration building multimedia environments for being used by individuals. Bill Kluver, Robert Rauschenberg, Robert Whitman and Fred Waldhauer cofounders of Experiments in Art and Technology participated in projects with teams with more than fifty artists and engineers integrating electronic media to encourage audience to participate. Computer as a "meta-medium" that unifies all media in an interactive interface, proposed in 1977 by Alan Kay, is than created already within this existing context.

Actual formats of hypermedia and hypervideo can be highly complex and include materials of diverse formats (e.g. video, image and text) intertwined with fixed or dynamic connection. Most common hypermedia format used in learning objects, in the

internet, CD-ROMs and DVDs are also structured with fixed links. Most common authoring tools are optimized to develop these types of links that generate hypermedia structures in tree-like or web-like structure. Word processors or presentation editors also allow to structure documents with anchors and hyperlinks to external resources. External resources can be other documents, or other type of files (e.g. video files, sound files) that may be in local folders (in the computer), in external drives or in the WWW. More complex hypermedia editors allow building data based hypermedia where dynamic links are generated by the application engine that can for instance present media segments according to semantic relations between them. Many examples of this applications can be provided as *Vox Populi* (Bocconi, 2006), *SEPIA* (Streitz et al., 1992), *Storyspace* (Bernstein, 2002), *Korsakow* (http://korsakow.org) and several other applications developed specifically for educational projects that will be addressed ahead in chapter 2.

The structure of hypermedia objects can vary to a great extent, with respect to the number of connections for each single segment of information, their number and the way they are connected to each other. A greater number of segments of information will allow greater variation of structuring formats. If there are several documents or files linked with each other, they can be linked in a tree-like structure, web-like or in database structure. The number of connections is also highly relevant. The higher the number of choices for each page the most complex may the document get. The way documents are connected also influences the structure. If connections are unidirectional and the user can't return to the previous segment of information, navigation will be very different from one that has bidirectional links allowing the user to return to the previous document. Many hypermedia structures may have a "home" menu, where the user can always return to guide himself.

Hypermedia by definition is non-linear in terms of the possibilities of navigation. That is, for a certain beginning, there is not a pre-established middle or end, as there is in a movie or in a book. In a book there is a suggested main sequential order and eventually there may be punctual deviations but always returning to the main path. For example this thesis, if published in a PDF can be considered a hypermedia document, as in the index there are anchors[29] to the

[29] Anchors are internal links in a document or a single web page. They are generally used to allow easy navigation from indices (where are placed links) to chapters or topics (where are placed invisible markers called anchors).

chapters and sections of the document, and there are some links to annexes or web pages, but still there is a suggested reading sequence (it starts in the introduction and ends in the concluding remarks). In the opposite spectrum in terms of sequencing information, hypermedia can be random, in these formats reading or visualizing options proposed to the user are generated in an arbitrary way.

Database hypermedia can be set to present media in arbitrary ways but generally the idea is to propose navigation options to users according to the categories and rules associated with the materials' metadata. In *semantic hypermedia* as we have seen navigation options are generated according to the keywords that are part of content metadata. The term *semantic hypermedia* is generally used in the context of the development of the semantic web[30] but in this work it is considered as a digital media structuring format on its own.

The term *sequential semantic hypermedia* may also be used in this work to refer to semantic hypermedia in which the metadata associated to nodes proposes some sort of sequence. In a regular semantic hypermedia structure the author only tags nodes with keywords that identify its content. The engines of regular semantic hypermedia generally present the final users options that will have the same keywords or keywords with some sort of semantic connection to the content being visualized. In *sequential semantic hypermedia* the author defines which keywords the engine should search in order to provide options from categories of keywords that can be very different from the content being visualized. For instance if we are seeing a video that explains how clouds form in a regular semantic hypervideo we will probably have several options to see more examples that explain the same process. In a *sequential semantic hypermedia* the user can be presented with options to see movies that explain other phenomena in the cycle of water, for example, an explanation of why it rains. If this example shows stormy clouds the next options may include an explanation of how thunders form, and so on.

In traditional linear formats the author's main concern is the sequence of ideas and events, in hypermedia digital formats the concern should be rather to provide meaningful interactivity. The hypermedia author should not think about a passive audience or an obedient reader, but instead consider their public to be active users. There are two fundamental issues to

[30] There is a first reference to a *Semantic Hypermedia Design* method in 2003 by Lima and Schwabe (2003).

be concerned with in what concerns the user experience: user interface and navigability. These two issues are the typical concerns of any user computer interface (UCI) designer. Whenever creating web pages or hypermedia, the UCI designer should think about the structure it should have in order to better present or represent real aspects of the subject being addressed. For example if developing a web page for a formal company that valorizes its internal hierarchical structure the site should be defined in a rigid tree-like structure. If by opposition the site is for an organization that valorizes its horizontal governance structure, the site should mimic a web like diffused structure. If dealing with some company or government website, where there is an increasing multitude of different people or products involved, then a data base structure may be the most convenient way to deal with its structure allowing a dynamic presentation of options. Just as designing sites for companies or organizations, designing hypermedia objects to organize information or to address specific subjects should be oriented by the same principle. This principle may be quite obvious for experts in each field but for students learning a specific subject it might not be that obvious. In complex fields of study where there may not be a straight answer to most questions, database solutions seem to be the most adequate way of organizing learning objects and providing adaptive learning paths. According to Brusilovsky and Henze (2007):

> *"Despite the fact that techniques from adaptive hypermedia have proven their successfulness in providing individually optimized views on large hypertextual information spaces, wide-spread use of these techniques in e-learning is still pending." (p. 692)*

The authors believe that wide use of adaptive hypermedia is mainly a problem of re-usability and interoperability that is keeping these formats to flourish. They suggest that "open", dynamic information spaces, such as the *semantic web* should inspire new developments. Concerns about the use of semantic hypermedia in education are not recent and were first discussed even before the term *semantic web* was ever used. Morrisson and Collins (1995) propose the term *epistemic fluency* to define what is learned, whenever someone understands a "semantic structure". The development of *epistemic fluency* takes place when one learns semantic structures, and understands the "epistemic form" that is the basis for its creation. To do this, is to play an "epistemic game" with information. This can happen in the private arena of internal cognition as when reading a book. Nonetheless, the authors believe that *epistemic fluency* developed to a greater extent in a social context:

> *"Understanding the linguistic and sociocultural basis of epistemic-game theory allows us to postulate how epistemic fluency is acquired. Following the work of Vygotsky and others (Vygotsky, 1978; Newman, Griffin & Cole, 1989), it seems reasonable to assume that epistemic fluency, like language in general, develops in the context of social interactions with other members of a community of practice, including those who are at least slightly more expert at playing these games." (Morrisson & Collins 1995, p.43)*

Following Wittrock's (1991) model of generative learning, Morrison and Collins (1995) believe that deep understanding or true knowledge construction "is more likely to occur when individuals actively transform information and integrate it into existing cognitive structures" (p.43). George Siemens's approach to knowledge construction is also highly related to the one presented by Morrison and Collins. Also making an association between cognitive structures in the mind and semantic structures of information, Siemens states that the presence, or addition of a new node within the network does not ensures knowledge transmission, transference of meaning or learning by itself. The new node "must be encoded and connected to other elements of the network" (Siemens, 2004, p.21). For Siemens, these nodes can be several things: "nodes may be people, organizations, libraries, web sites, books, journals, database, or any other source of information" (Siemens, 2006, p.29). Therefore learning is not the construction of a puzzle of ideas and concepts, but rather a process of knowing how to easily have access to relevant and reliable sources of information. Siemens reuses a famous quote from Samuel Johnson claiming that knowledge is of two kinds. "We know a subject ourselves, or we know where we can find information on it" (Ibid., p.32).

Several authors claim, that there is in fact a growing use of the internet, new applications and online services. Nevertheless the major concern is that the corresponding desirable research regarding its impact on the learning process is lacking (Hill et al., 2004).

> *"Surprisingly, despite the seemingly widespread diffusion and use of the internet, we have yet to develop a clear understanding of the impact these technologies have had and are having on the process of learning. Theoretical and research foundations have not kept pace with technological growth and use." (Ibid., p.433)*

Also the great amount of possibilities to explore with the available applications and services that now allow the use of digital media in the class is still considered poorly explored by professors or by innovative approaches (Alava, 2007).

> *"The research in the field of mediation is anchored on an emergent and poorly explored field of professional practices. The professional practices using media are often innovative and therefore by definition under construction"*[31] *(Alava, 2007, p.109)*

This research scenario that is evolving in the last two decades has pushed researchers in the field to propose their own innovative solutions in the form of new applications and new approaches to the use of available technologies. In recent years it seems that the interest in the semantic hypermedia projects is increasing and several projects have been developed and are presenting their results with great optimism and reporting successful implementations of semantic systems as great potential learning environments (Torniai et al., 2008; Wilson, 2009; Li & Dong, 2009; Heiden et al. 2010).

1.3. This thesis and research study

In this thesis we describe the research study developed and the projects performed in the University of Texas at Austin, USA, and in the University of Lisbon, Portugal. It summarizes the activities, the discussions and literature review done in this research study and the analysis of results of the projects.

The main objective of this study is to develop empirical research in the context of innovation in teaching and learning practices within the framed scenario that educators and researchers face today in higher education. This research study explores and discusses the effectiveness to support the development of digital skills and attitudes in a problem-based teaching and learning model oriented to the production of semantic hypermedia. The adopted approach was *design-based*, meaning that it focused on defining a set of reusable design principles that can support the definition of activities, tools and practices in order to solve an existing problem in a real learning context (Design Based Group, 2003). The problem in a broad angle was set as how to make students, in only few weeks of class activity, acquire and development a broad set of knowledge, skills and attitudes toward full digital media literacy.

The research study started with consulting with researchers and practitioners in the field, the exploration of literature and the definition of an initial teaching and learning model. After this initial phase an implementation project was developed, defining research questions

[31] Translated from French by the author.

and research tools and procedures to help the evaluation of the project.

1.3.1. The teaching and learning model design

The main learning objectives considered for setting this model were associated with the promotion of higher-order thinking skills associated with the use of the internet and the use of semantic hypermedia. To orient the design of the learning model, there were several concerns associated with learning design principles associated with the use of computer programs as cognitive tools, to use the internet as source of materials and information and its use also as a social networking environment. The teaching and learning model design oriented teacher and students in order to develop a semantic hypermedia project by students. To develop these projects students had some predefined stages and recommendations to guide their activities and practices that we listed here:

- **Research and exploration of a subject of relevance for students** - students define topics to address, search them in the internet and collect materials to use in their projects;
- **Design and development of a semantic hypervideo** - students should think and define semantic structures to organize developed media segments that will be assembled in the hypervideo using a given application;
- **Projects presentation and discussion** - students should present and discuss their project with each other's and consider ways to improve their work.

The *Korsakow* application, available in the community website (http://korsakow.org), was identified as the application with ideal characteristics to use in this project. It is a recent software created by Florian Thalhofer and was considered to have a unique way of structuring media that allows the creation of both fluid and sequential semantic oriented hypervideos. Some other characteristics supported its choice, the fact of being open source and free to use in educational projects[32] and its user friendly interface. Several professors already use the application in their courses but there is still few studies or reports on its use in educational contexts. The only academic papers on the subject are by Professor Scott Wilson (2009, 2010) and the most recognised work is by Professor

[32] *In the download page it is indicated to contact them in projects or production with budgets over 2000€ or 3000$ (http://korsakow.org/download).*

Adrian Miles that uses Korsakow since 2010 in media courses[33].

1.3.2. The research questions

Once defined the teaching and learning activity design the main research questions, here presented were set:

1. What attitudes and skills are developed when a semantic hypermedia authoring system is used in the classroom?
2. What attitudes and skills are developed when a learning activity promotes the use of the internet as a media provider?
3. What attitudes and skills are developed when a learning activity promotes the use of the internet as collaborative network?
4. Which design features can be improved in *Korsakow* application for promoting better usability in a learning context?
5. What can be done to improve the learning activity design to further support higher-order thinking skills?

1.3.3. The thesis layout

This dissertation is structured in seven chapters. The first chapter, that ends here, introduced the main theme and objectives of this study. It frames the research study and its relevance in the context of several aspects of social, cultural, political and economical evolution that relate to the uses of digital media and ICT developments relevant in the scope of education. It introduces the main references for this research and explores the most important terminology that will be used through the work. The second chapter presents the literature review and the state of the art in the research developed in the field. Here the main topics associated with the importance of teaching and learning with audiovisuals and to what extent digital media and multimedia contribute to the cognitive processes and to education are discussed. Section one and two in this chapter discuss the main theories that influenced the definition of the proposed teaching and learning model. And two remaining sections explore the teaching objectives and strategies followed in the definition of the whole teaching and learning model implementation. The third chapter reviews the main references used in

[33] Adrian Miles web page about his teaching activity (http://vogmae.net.au/vlog/teaching/)

the definition of the research study and the methods and methodology for the empirical work. A description of the research project and the design of the proposed learning model are offered. Details on the strategies, used software, main pedagogical options and main objectives along with a description of the developed research protocol and tools will be addressed. The following two chapters are dedicated to the presentation of the projects applied and developed in Austin, USA, and in Lisbon, Portugal. The context where the projects were developed, the participants, the main used application performance, the concrete application of the learning model and the achieved results will be described. The sixth chapter is dedicated to the discussion of the findings from the two educational projects in the perspective of the explored literature, providing tentative answers to the proposed research questions. Design principles and procedures are presented and discussed extending the versatility of the model to other contexts. The seventh chapter makes a summary of the findings and a balance of the achieved objectives of the research study placing it in the path of future research in the area. Annexes follow the thesis in CD-ROM with a PDF with written data and two interactive video examples.

Chapter II

2. Teaching and learning with digital media

The use of digital media in the context of higher education should be considered with special attention. Many assumptions about the benefits of using digital media for instruction prove to be incorrect and lead to instructional practices that do not foster learning nor enhance motivation. The aim of this chapter is to review research associated to the use of digital media in education and discuss pedagogical approaches and design principles, which have been explored with success in real life contexts.

The first section will focus on the importance of audiovisuals in the cognitive processes and discuss the relevance of using interactivity combined with different media in learning activities. Following, a second section is dedicated to the discussion of the main theories and considerations over constructivist and social cognitive learning theories and to what extent these theories have contributed to the evolution in instructional technologies and learning models used today. The third topic is centered in the teaching strategies discussed by several authors and practitioners, and in how building on social and constructivist learning theories, they developed research and embraced new uses of technology in the classroom and outside it. The last section closes the chapter presenting several contemporary author's ideas and propositions to set new goals, competences and skills, considered a need in schools and universities today.

2.1. Audiovisuals, multimedia and the human brain

Audiovisuals and multimedia are increasingly used for instructional purposes both in the formal and informal learning contexts. The media characteristics allow powerful formats for communication and learning about diverse subjects (Pasquali, 2007) albeit its application in education may not always be successful. While many studies report the

success of using audiovisuals and multimedia in education, there are other research studies that contradict many assumptions regarding the superiority of video and multimedia learning objects in comparison to more static and traditional didactic materials or learning environments. It is tempting to consider that poor results drive from poorly designed materials or implementations, without carefully analyzing other relevant factors that might also be in the origin of failure. At this point it may be useful to present and discuss some authors, and their ideas, that provided consistent models and principles that guide design and production of media taking into account human's cognitive characteristics.

Emerging technology advancements facilitate the use of images, sounds and video in learning contexts. Educational digital media allows access to learning opportunities that could not be otherwise available. Albert Bandura is one of the first authors to recognize and support the usage of mediated learning solutions for education based in the exploration of unconventional formats.

> *"Symbolic modeling by verbal or pictorial means greatly expands the range of verification experiences that cannot otherwise be secured by personal action because of social prohibitions or the limitations of time, resources, and ability." (Bandura, 1977, p.181)*

Using of visual and audio materials showing others performing actions and events was considered very convenient for many educational and training objectives and became widely used since the eighties. The potential of video in education was since then explored by many researchers, however the passivity of the viewer was for many years considered a drawback for several researchers increasingly supportive of constructivist learning models that supported the active role of students in their own pursuit for knowledge. Multimedia was then considered to provide the field for discussion as it introduced some sort of physical interaction allowing students to choose their own paths at their own pace.

2.1.1. Cognitive load and moving images and sound

The influence of technologies in the way our minds work is a concern that has always been present when new media is introduced in people's lives. Through history there were always those who condemn, "the way things are going" and the ones that tend to glorify its effect.

Bandura illustrates several situations in which positioning learners to observe others is advantageous for learning. He presents several studies on indirect reinforcements that support the effectiveness of presenting to the observers the act of rewarding successful models. By attending to the pattern of success and failures of others, observers generally learn faster than performers themselves. "This is especially true if the tasks depend more heavily on conceptual than on manual skills" (Bandura, 1977, p.122). Bandura further argues that:

> *"Performers may have difficulty discovering the connections between actions and outcomes because they must devote at least some of their attention to creating, selecting, and enacting the responses and to their reactions to the consequences impinging upon them. Observers in the other hand, can give their undivided attention to discovering the correct solutions." (Ibid., p.122)*

While Bandura reports less stress and better conditions to avoid information overload, Gaston Mialaret (2000), presents some concerns to this respect, as the learner's capacity to adapt to new audiovisual languages and to fast paced rhyme of information may limit these media effectiveness.

> *"The problems raised by audiovisuals techniques are today quite different from what they were when animated images were brought to families and schools. Even adults, in the beginning of the modern cinema period, had difficulties in following the story thread if flashbacks were used, or parallel story editing, or any other cinematographic language figure."*[34] *(p. 68)*

Mialaret's concerns are associated with people's ability to cope with the audiovisual self-imposed rhythm. This author states that audiovisuals, contrary to other more traditional formats as the book, generally don't facilitate being revisited. He believes that visual memory alone is insufficient for a solid meaningful knowledge construction.

> *"He believes that he knows because he saw and he recalls to have seen (information layer). Knowledge is not only to have seen, but being able to relate with, to explain, to transfer… The usage of audiovisual techniques in class requires then a complementary explanation, analyses, integration work without which the student will remain at the level of "I saw that on television" and does not integrate it with his knowledge, and his ways of*

[34] Translated from Portuguese by the author.

thinking."[35] *(Ibid., pp.72-73)*

The problems raised here by Mialaret are consistent with the concerns of many researchers and practitioners in education that believe that such technologies are supportive of more passive and less critical learner involvement.

Audiovisual learning principles

The use of audiovisual and multimedia has been for several years considered effective, even if it was not associated with demanding research. People in general seem to enjoy motion pictures and multimedia and therefore prefer these formats and tend to believe that multimedia will help them learn. Our visual and auditory system is adapted to interpret reality in motion and therefore it seems logic that most learning situations could benefit from this option. Associated with many studies there is also the novelty effect. When people are presented with resources with new and socially valorized technology they will likely create a good impression and be supportive of the adopted format, even if they did not cognitively benefited from the experience. Some research, comparing learning situations with "static visual display" against others with "dynamic visual display", revealed that in many cases there was no significant difference between them in terms of retention (Park & Hopkins, 1993). From 27 studies, 12 found no significant differences in learning results. Detecting in which conditions are there significant benefits when using audiovisual resources is important to understand how to best design and manage investments in what concerns materials production or usage. Ok-chon Park and Reginald Hopkins (1993) believe that most inconsistencies in results from the research studies had to do with not taking into consideration learners' characteristics, learning requirements, or task characteristics. Also used materials failed to take advantage of the didactic medium attributes. Three features in which dynamic representation attributes seem to make significant difference are:

- Attention guide – motion can direct student's attention;
- Illustration aid – sequencing relations in procedural actions are reinforced;
- Representation of domain knowledge that includes movement – situations that involve motion and action improve model formation.

[35] Translated from Portuguese by the author.

Park and Hopkins (1993) present six instructional conditions for which they recommend the usage of video or dynamic visual representation:

- Demonstrating sequential actions in a procedural task;
- Simulating causal models of complex system behaviors;
- Visually manifesting invisible system functions and behaviors;
- Illustrating a task difficult to describe verbally;
- Providing a visually motional cue, analogy or guidance;
- Obtaining attention focused on specific tasks or presentation displays.

Teresa Chambel et al. (2006) reinforce the idea that audiovisual usage should be justified and adjusted to the learner context. They found that video and multimedia support cognitive benefits when:

- Replacing real experience – when authenticity and realism evoke feelings of observing real situations;
- Visualizing dynamic processes – when dynamic aspects of reality are not observable by human eye, or when they are very hard to describe verbally;
- Combining diverse symbols systems – when pictures, text and narration are combined in coherent messages.

The main difficulty in this field of research seems to be the existence of so many variables in place. The manner how students are selected, the learning environment, the quality of the materials, the level of interaction provided and the pedagogical approaches all influence the implementation success and the research results. Analyzing multiple studies, Lawrence Najjar (1996) came to conclude that the use of images with text did in general work better for assembly instructions or procedural information. For procedural information, the results were also good when instead of images animation was used. For learners to recognize information (e.g. remembering faces) or for spatial information (e.g. maps) pictures were proven to be more effective than videos. For small amounts of verbal information sound recordings alone worked well. In recording information for problem solving or for learning details in long stories the best formats were considered to be video or animations with soundtrack or explanatory verbal narration. Authors as Richard Clark and David Feldon (2005) are also very critical in what concerns the assumptions and beliefs

that support the superiority of using audiovisuals and multimedia in education than any other media. By analyzing studies that compare live courses with distance learning or computer based courses, they deconstruct the expectations associated to multimedia instruction. The common assumptions they question claim that multimedia instruction:

- *Yields more learning than live instruction or older media;*
- *Is more motivating than other instructional delivery options;*
- *Accommodates different learning styles and so maximizes learning for more students;*
- *Provides animated pedagogical agents that aid learning;*
- *Facilitates student managed constructivist and discovery approaches that are beneficial to learning.*

Concerning the first assumption the authors claim there is no credible evidence supporting learning benefits associated with the use of multimedia that cannot be explained with other factors as, for example, the instruction method.

In what concerns motivation, again, authors find no evidence of actual more motivation to learn with associated multimedia. The assumption of multimedia instruction to accommodate different learning styles and consequently maximizes learning for more students is also frustrated as generally learning resources are chosen by learners according to their learning preferences and the authors refer to several studies that report no correlation between students' learning preferences and their performance on the reasoning tests. Animated pedagogical agents or computerized characters (either humanlike or otherwise) designed to facilitate learning are reported in some studies to be considered as distractions rather than to improve learning. The last common assumption that associates multimedia instruction to student managed constructivist and discovery approaches and consequently learning benefits is put against several studies that prove unstructured multimedia resources are less effective than structured ones and that balancing the multimedia complexity to adjust the right level of information load in order to provide optimal cognitive capacity is very difficult to attain. Although sustaining a critical approach, Clark and Feldon (2005) are still highly supportive of the use of multimedia in education:

"*Multimedia instruction offers extraordinary benefits to education including a wide range*

> *of instructional options and, with adequate instructional design, considerable reductions in the time required to learn, the time required of expert teachers, and when large numbers of students are involved, the cost of learning." (Clark & Feldon, 2005, p.110)*

They nevertheless insist that before investing in any use of audiovisual and multimedia practices it is important to check for research evidence. We propose to begin by reviewing Mayer's (2009) and his colleagues' work, one that is widely recognized in the field.

Mayer's cognitive theory of multimedia learning

Several authors following the work of such recognized researchers as Allan Paivio (1990) and Alan D. Baddeley (1999) have come to support the claim that "students learn better when provided with visual and verbal knowledge representations rather than visual or verbal representations alone" (Moreno & Valdez, 2005, p.43). One important reference is Richard E. Mayer (2009), who proposes a cognitive theory of multimedia learning to sustain the use of multimedia in education following several principles in its application.

Mayer's (2005) theory is based in the assumption that the human mind is split into long-term memory and working memory. *Long-term memory* is where knowledge and information is stored in the mind. *Working memory* is where information is temporarily stored while processing new information. *Working memory* has limited capacity and evidence showed that it "is only able to hold 7 elements of information" at a time (ibid., p.21) and it "can probably process [it] in the sense of combine, contrast, or manipulate no more than 2-4 elements" (ibid. p.21). The limitation has also to do with the time it is able to maintain new elements available for processing: "…almost all the contents of working memory are lost within about 20 seconds" (ibid. p.22). As Mayer argues in his book "Multimedia Learning" (2009), this previous research provides a basis for interpreting the results of his studies and of several other researchers in the field. Three main assumptions are central:

- ***Dual channel*** – the working memory has two channels for processing information, one verbal and another pictorial;
- ***Limited capacity*** – each verbal and pictorial processing channels is limited as to the amount of information that can be processed;
- ***Active processing*** – humans engage in active learning by attending to relevant incoming information, organizing selected information into coherent mental

representations, and integrating mental representations with other knowledge in long-term memory.

These three assumptions allowed developing several principles that were tested with several experimental comparisons and with separate groups of students and different media solutions for each group. His tests and analyses not only evaluate rote learning but also provide understanding of what is presented when both retention and transfer tests where developed. Most of the experiments explore how much cognitive load students feel and the results they achieve after they are confronted with multimedia didactic materials. The proportion between the stress and effort students put in the learning activities and the corresponding results is balanced to support the best learning solutions. These experiments involved both print resources and screen and audio materials and derive in the formulation of three principles that highly support the use of multimedia for learning purposes:

- ***Multimedia Principle*** – "people learn better from words and pictures than from words alone" (Mayer, 2009, p.268);
- ***Modality Principle*** – "people learn better from graphics and narration than from animation and on-screen text" (ibid., p.268);
- ***Segmenting*** – "people learn better when a multimedia message is presented in user-paced segments rather than as a continuous unit" (ibid., p.268).

These principles should be read along with other nine principles that complement and also frame the production of multimedia materials. Mayer presents five principles that claim the need to reduce information that is not essential to the topic being studied. Supplementary information may demand what he calls extraneous processing that may result in cognitive overload and then reduce learning results. Principles for reducing extraneous processing:

> ***"Coherence Principle****: people learn better when extraneous words, pictures, and sounds are excluded rather than included.*
>
> ***Signaling Principle:*** *People learn better when cues that highlight the organization of the essential material are added.*
>
> ***Redundancy Principle****: People learn better from graphics and narration than from graphics, narration and on-screen text.*

> ***Spatial Contiguity Principle:*** *People learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen.*
>
> ***Temporal Contiguity Principle:*** *People learn better when corresponding words and pictures are presented simultaneously rather than successively." (Ibid., p.267, emphasis added)*

To what concerns the essential elements for processing besides the *Segmenting* and *Modality principles* he presents

> *"**Pre-Training Principle:** People learn better from a multimedia lesson when they know the names and characteristics of the main concepts." (Ibid., p.268, emphasis added)*

Elements that contribute to enhance motivation and deeper understanding complementing the first enunciated *Multimedia Principle* are:

> ***"Personalization Principle:*** *People learn better from multimedia lessons when words are in conversational style rather than formal style.*
>
> ***Voice Principle:*** *People learn better when the narration in multimedia lessons is spoken in a friendly human voice rather than a machine voice.*
>
> ***Image Principle:*** *People do not necessarily learn better from a multimedia lesson when the speaker's image is added to the screen." (Ibid., p.268, emphasis added)*

Mayer (2005) believes that meaningful learning happens when active learning occurs. As already mentioned, three essential processes are considered:

- ***Selecting*** relevant material;
- ***Organizing*** selected material;
- ***Integrating*** selected material with existing knowledge.

He further describes these actions:

> *"Selecting relevant material occurs when a learner pays attention to appropriate words and images in the presented material. This process involves bringing material from the outside into the working memory component of the cognitive system. Organizing selected material involves building structural relation among the elements - such as the five kinds of structures described in the preceding text [process, comparison, generalization, enumeration, and classification]. This process takes place within the working memory component of the cognitive system. Integrating selected material with existing knowledge*

involves building connections between incoming material and relevant portions of prior knowledge." (ibid. p.37)

All these discussion and enumerated principles for developing multimedia didactic materials reveals three things, first that it involves much production work, second that it requires special knowledge and skills to develop good materials, and third principles deriving from most research do not guaranty success but rather better chances of success. Mayer's cognitive theory of multimedia identifies interactivity as potentially supportive of learning, however interactivity has now become a major feature associated to multimedia and still raises much discussions concerning its contribution for learning.

2.1.2. The cognitive contribution of interactivity

Several authors agree and extend Mialaret's claim that video is primarily a narrative medium and accordingly it does not, easily and on its own, support active learning (Mialaret, 2000; Shephard, 2003; Miller, 2004; Laurillard, 2002; Reed, 2009). This was specially considered because of lack of user-control. However these authors consider that when video is delivered through a computer allowing the user to interact with it, it becomes more adjusted to learning objectives.

"Developing interactivity between user and learning resource remains an important aim in the design of learner support activities." (Shephard, 2003, p.296)

Mayer (2009) supports the idea that multimedia learning, even when students study alone can be considered a social event as, for the student, it "can be viewed as a conversation between the learner and the instructor" (p.243). Conversation is by definition interactive. This supports the personalization principle already mentioned. Mayer claims that the length of the learning resources for students should be reduced to small bits of consistent information. One of the main experiments he describes for supporting this principle is one where it is proved the advantage of presenting a two and a half minutes animation on lightning formation in a sixteen segments interactive unit, rather than a continuous movie (Mayer, 2009). This experiment seems to prove that letting the user control the pace of the information flow is important to prevent overload of the working memory available for processing the new information.

Learning styles

The adaptability of learning content to the student's rhythm is also supported by other researchers that claim that learning styles should be respected and that more variety of learning solutions can better satisfy students' learning requirements:

> *"Learning Styles, or cognitive preferences, that determine the ways of learning best suited to them. There are many theories, models, and instruments to determine learning styles, but they are all essentially based on the idea that individuals perceive, organize or process information differently" (Chambel et al., 2006, p. 5)*

At least three theories can be identified to support that some students have more passive learning styles and other require a more concrete and active style of learning:

- *"VARK" Perceptual Learning Styles* (Fleming,1995): *visual, aural, read-write,* and *kinesthetic*;
- *Kolb's Learning Styles Inventory* (Kolb, 1984): *reflector, pragmatist, theorist,* and *activist;*
- *Howard Gardner's Theory on Multiple Intelligences* (Gardner, 1983): *verbal-linguistic, logical-mathematical, visual-spatial, musical-rhythmic, bodily-kinesthetic, interpersonal, intrapersonal*, and *naturalist.*

Chambel et al. (2006), while considering these differentiations, believe there is a need to support activities and environments that are flexible enough to integrate different styles:

> *"An ideal learning environment would support all the learning styles, with the flexibility to allow each learner to spend more time on her preferred style, and induce the development of skills in non-dominant styles. It is important to note in this context, that not only different individuals, but also possible interactions between different individuals in learning groups, might be considered. (p.6)*

Multimedia educational projects can easily include different types of materials adjusted to different styles such as text based, video based, audio based, image based, and manipulation. Besides different learning styles single educational projects can be designed to include materials with different levels of difficulty and allow a progression in the student's evolution (Miller, 2004). Systems of reward can also be included in multimedia projects that can serve as motivators.

Chambel and Guimarães (2002) present the term *hypervideo* as videos that allow navigation by the user through multiple video segments as in hypermedia and hypertext. They claim that hypermedia principles from early studies can be applied to *hypervideo* providing good clues about users' needs and demands in this kind of systems. Summarizing from some authors (Marra, 1996; Zahn et al., 2005, Chambel et al., 2006; Moos, 2009) here are presented most reported principles:

- ***Control*** – having mechanisms that provide users with clear information about the existence of links on the video (where, when, for how long);
- ***Consistency and coherence*** – providing verbal and graphic information hierarchies to structure interface and navigational options;
- ***Context for orientation purposes*** – providing the synchronization of video with navigation or structure maps to allow users to know where they are within the *hypervideo* environment;
- ***Familiarity*** – adopting metaphors for the interface and navigational structure (e.g. television, books, traveling);
- ***Continuity*** – having a constant layout or providing clues for what will follow some link, especially when navigating between dynamic and static media, for a sense of unity and coherence.

In interactive learning environments the learner can choose what he believes is most adjusted for him. While some authors believe that the learner's options may not always be the best for his learning trajectory, it seems that these possibilities give the user a larger sense of involvement and freedom that is important for his engagement and satisfaction. Carlos Correia and Irene Tomé (2007) refer that users' options whichever they may be will result in his or hers curiosity and self-determination. While following hypermedia options, users will be activating processes of idea association. Curiosity as Sugata Mitra (2008) claims is one of the best allies in the learning activity:

> *"I don't know if it is a teacher inside us, but there is a learner inside us (…) it decides what is important and not important. (…) the learner can be turned on by curiosity and by mystery."*

Structuring ideas

Regarding the use of computers in education, Gaston Mialaret (2000) recognizes one particular potential that most authors have failed to identify. In addition to allowing people to manage information or to use simulations, he claims that computers are inspiring as they allow students to search and structure ideas.

> *"... the acquisition of schematics structures requires reflecting on actions rather than simply recalling them." (Reed, 2009, p.55)*

The authors Steve Pollock and David Squire (2001), although recognizing the interactivity potential, claim that there is still much to do before multimedia and linear video can be balanced in order to provide good learning environments. They feel there is still a collision between the views and conflicts of interest of both TV producers and educational material producers:

> *"Television attempts to make sense of things: to engage, to simplify and edit often complex information, to make programs that are accessible to large audiences. The education world tends to disapprove of this approach, believing that, in the processes of making something simpler and more accessible, values and meaning get watered down, giving a false impression of a subject. Television in the mind of many academics distorts perception and values, oversimplifies and generates passivity and desensitization in its viewers." (p.213)*

The authors present the internet as a medium with potential to education but that is still in development. They point out as limitations being often sluggish and cumbersome and providing too many options to users therefore being for those reasons counterproductive in what concerns learning.

The authors believe that the internet provides users with too many options, and parallel browsing, that still distracts users, as "all play and no structure makes a web surfer switch off" (Pollock & Squire, 2001, p.215). This concern is expressed by several authors. Correia and Tomé (2007) claim too much liberty can lead to cognitive disorientation. There are in fact some tools that allow the user to return to previous visited sites. Some of these features may help a focused user but may not be of great help for a less concentrated student. Nevertheless, in their opinion, hypermedia systems can be highly structured and be prepared to provide better options to any kind of user depending on the programmer's or

authors' ability to develop such systems.

According to Yves Bertrand (1995) interactive instructional materials have been developed since the 1930's. Already in the early 1960's computer assisted teaching applications began to be developed. Soon the applications were also used as artificial intelligent agents that would be used by, or adapted to, students. These applications mainly tried to couple behaviorism and instructional design. By the late seventies constructivist cognitive theories influenced the design of learning environments supporting a more student oriented perspective supporting non-linear and non-sequential ways to present information which provides students the opportunity to choose their own paths. In the eighties, following the spread of the internet there was a great evolution from closed learning environments to a great variety of open systems that tried to take into account that students are relatively unpredictable and uncontrollable as to how they function and that specific subjects may require flexible formats of representation.

These explorations are adopted in very specific contexts and are considered far from being mainstream even today. Authors as Scott Wilson (2010) note that, for instance, in the social sciences, academics are accustomed to present their research results "using a very narrow spectrum of interface/database pairs: the written article, the book, the video or the website" (p.1). He claims such formats influence the way of selecting information and re-organizing it to tell a "story" (e.g. emphasizing cause-and-effect).

> *"[T]he linear fashion in which data is arranged emphasizes clear-cut, logo-centric casual connections that marginalize alternative interpretations of what are in reality multi-stranded sequences of events" (Wilson, 2010, p.2)*

Along with authors like Janet Murray (1997) and Steve Anderson (2004), Wilson considers that database and narratives that were once characterized by Lev Manovich (2001) as "competing" ways of organizing the world are now increasingly merging into new formats. Marsha Kinder (2003) and Randy Bass (1999) also see rising digital media formats bringing new possible structures where "story and archive" can work together to allow representation formats that emphasize decentered structures shifting from "hierarchic to rhizomic structures" (Bass, 1999, p.660).

From earlier works from authors as Roy D. Pea (1985) or David N. Perkins (1986),

that explore problem solving learning processes using applications for helping structuring and visualizing information (e.g. spreadsheets, outliners), authors like David H. Jonassen and Thomas C. Reeves (1996) explore the uses of other software to facilitate thinking and higher order learning. They explore several examples where applications were considered to provide effective environments for developing databases, semantic networks, multimedia, hypermedia, collaborative knowledge construction, programming and others. Their work supported the idea of students as designers using their previous knowledge and tools to develop better thinking models and solving problems.

> *"Some of the best thinking results when students try to represent what they know. Representing knowledge as a mindful task can be enabled by cognitive tools such as hypermedia construction software or electronic spreadsheets. Such cognitive tools require students to think in meaningful ways to use the application's capabilities and features to represent what they know." (Jonassen & Reeves, 1996, p.696)*

With the evolution of hypermedia applications these come to be considered by many authors as Turo Iiyoshi and Michael Hannafin (2002), Teresa Chambel et al., (2006), Daniel Moos (2009), Min Liu and Stephan Bera (2006) as increasingly effective cognitive tools. These authors analyze different user-centered learning environments where students' uses of hypermedia applications effectively support open-ended and interactive constructivist learning activities.

> *"Cognitive tools include both mental and computational devices that support, guide, and extend the cognitive process of learner. They can amplify cognitive functioning and facilitate the creation of personal knowledge."(Iiyoshi & Hannafin, 2002, p.2)*

Hypermedia environments not only provide opportunities for the learner to regulate the amount, sequence, and flow of available resources, as we already addressed, but also may allow for new forms of customization. Some hypermedia applications are designed to be also used by the learner to search for key information and include new contributions as new materials, new connections or new information. Iiyoshi and Hannafin (2002) propose a categorization of five different hypermedia tools:

- ***Information-seeking*** – allow the learner to browse or search with open-ended structured information;

- ***Information-presentation*** – in such applications the learner can select relevant or appropriate information, attributes or details while ignoring others considered irrelevant, and choose from different presentation modes;
- ***Knowledge-organization*** – in these applications the learner can manipulate representations and relationships between available information promoting a unique and exclusive interpretation;
- ***Knowledge-integration*** – these tools allow connecting new with existing information;
- ***Knowledge-generation*** – these applications allow the creation of learning objects integrating media elements according to the learner's individual goal.

Hypermedia learning models

The discussion about the use of hypertext and hypermedia in education grew considerably in the 1980's. Most research studies done in this period fail to compare methods using different hypertext or non hypertext systems. Most results are not significant in effect, are inconsistent, contradictory, or not conclusive. This may occur from large variation in the system's design, the system contents and the design of the research itself. Only in late eighties well-developed models for hypertext based learning were proposed providing a framework to the discussion and evaluation of hypertext effectiveness in education. Two of these models are the *construction integration model* (Kintsch, 1988) and the *cognitive flexibility theory* (CFT; Spiro et al., 1988). Both these models are based in the idea that prior information is crucial to the learning process and that the learner profits from engagement in active learning.

The *construction integration model* places the emphasis in the learner construction of a "situation" model constructed integrating prior knowledge with new available information. In this learning process, the hypermedia user must be intellectually active while interacting with the proposed media. The hypermedia system fails if the user is not actively engaged while navigating the system. One rule for developing hypermedia according to CFT is to keep segments of information small in order to avoid overload. The aim is to present situations or "cases" from multiple perspectives providing opportunities for the learner to construct his own view about specific themes or concepts. If the user is

only randomly choosing options or is following along a proposed path no differences will appear between the use of hypermedia and any other media (Shapiro & Niederhauser, 2008). The CFT proposes that the learner reconstructs new mental representations when dealing with new information. For such reconstruction to take place, the learner must be flexible enough to deconstruct prior knowledge (*mental schemes*) and accept new data and build new and better adapted mental representations. In this process, hypermedia is considered a valuable technology as it allows better representing real-world cases (Ibid.). Rand J. Spiro et al. (1988) claim that the production of learning objects in most common formats of text, video and hypermedia seem to have contributed for the oversimplification of subjects that may seem to be highly efficient in introductory levels of learning but may be incompatible and compromise advanced knowledge acquisition. Spiro et al. (1988), claim that methods and materials used in introductory education are responsible for various kinds of misconceptions. These misconceptions are associated to:

- ***Overgeneralization*** – e.g. “areas of subject matter are seen as being more similar than they really are” (p.3)
- ***Dysfunctional biases in mental representations*** – e.g. “dynamic processes are often represented more statically” (p.3)
- ***Prefigurative "world views"*** – e.g. “presupposition that the world works in such a way that "parts add up to wholes" leads students to decompose complex processes into components that are treated (mistakenly) as independent” (p.3).

These misconceptions, according to Spiro et al., support each other combining themselves to generate higher order misconceptions with which students arrive to college level education. Spiro et al. (1992) do not claim that linear materials are not valuable for learning. Rather, they support that in introductory levels professors and students should use linear materials. Actually, in a study concerning the interpretation of the motion picture “Kane”, students were encouraged to see the movie once or more before using the hypermedia application developed to help its interpretation. Although highly supportive of the use of hypertext in education, Spiro et al. (1992) claim that it is not easy to develop well suited hypermedia and implementing CFT.

> *"Implementing Cognitive Flexibility Theory is not a simple matter of just using the power of computers to 'connect everything with everything else'" (Spiro et al., 1992, p.67)*

Ana Carvalho (1999), analyzing her effort to develop a hypermedia application that would be done accordingly with CFT, claimed that it was "really complex to structure the knowledge in order to be congruent with the theory"[36] (p.206)

Some authors present themselves as skeptical to the real contribution that hypermedia brings to education. Having into account the great investment involved in producing high quality educational hypermedia, in one article Andrew Dillon and Ralph Gabbard (1998) propose a review of the benefits of hypermedia environments. They review more than 90 articles published in the early nineties, and the conclusions refer that "the benefits gained from the use of hypermedia technology in learning scenarios appear to be very limited" (p. 345). They summarize three broad deductions suggested by the empirical evidence:

> *"Hypermedia affords the most advantage for users in specific tasks that require rapid searching through lengthy or multiple information resources and where data manipulation and comparison are necessary. Outside of this context, existing media are better than or as effective as the new technology.*
>
> *Increased learning control over access is differentially useful to learners according to their abilities. Lower ability students have greatest difficulties with hypermedia.(…)*
>
> *Specifically, passive learners may be more influenced by cuing of relevant information, and the combination of learner ability and willingness to explore may determine how well learners can exploit this technology." (p.345)*

Spiro et al. (1992) are among the supporters of interactive systems but maintaining that their use should be adjusted to the level of complexity of the educational situation. They propose the use of a complex hypermedia system but only when knowledge domains are considered ill-structured and knowledge assembly processes are required. They conclude from their research that it is fundamental that information associated with complex cases should also be presented with complex hypertext systems that may resemble the real-world complexity and the ill-structuredness of the knowledge domain. They are among the supporters of computers as ideally suited to provide the needed flexibility for

[36] Translated from Portuguese by the author.

fostering cognitive flexibility based particularly in multidimensional and nonlinear hypertext systems.

> *"The shift in control of access from author to learner places a greater cognitive burden on the learner. Specifically, the learner must now monitor to a greater extent whether he or she understands what has been read, determine whether information must be sought to close information gaps, and decide where to look for that information in the text. In short, there are greater metacognitive demands on the reader during HAL [Hypertext-assisted learning]." (Shapiro & Niederhauser, 2008, p.605)*

The literature seems to indicate that hypermedia systems should then be used in education but not without taking into account the learning environment context, specific purposes and objectives, the design and pedagogical models and the level of the learners experience, prior knowledge and motivation.

> *"Turning students loose on a hypertext will not guarantee robust learning. Indeed, doing so can actually mitigate learning outcomes in some circumstances, especially if students are novices and offered no training, guidance, or carefully planned goals." (Ibid., p.618)*

Several authors present pedagogical frameworks and describe activities that have proven to be supportive for several learning objectives (Jonassen et al., 1996). For instance, authors Guimarães et al. (2000), support the use of *cognitive maps* (concept/idea maps) development to help students design their projects and facilitate exploratory activities of each other work. Miles (2003) describes the way he proposes exercises, exploring different metaphors, from simply adding video to desktop like interface, to structuring narratives with video segments that may work within randomly presented sequences. By the end of a set of three exercises, Miles claims that students can "see how complex narrative or multilinear possibilities can develop from quite simple and small sets [of segments]" (Miles, 2003, p.37). This, he claims, helps students understand that "complexity is not synonymous with the large scale nested or branching structures that is common when students first start trying to conceive of multilinearity" (ibid., p.37).

2.1.3. The semantic hypermedia effect

We have seen how hypermedia allows a more fluid approach for dealing with information than most traditional linear formats. Most hypermedia is mainly based in

hyperlinks between segments of information but there are many hypermedia systems that allow building and accessing information according to a web of semantic relations these systems, as already mentioned in the first chapter, are here named semantic hypermedia. As already mentioned, semantic hypermedia has been used in many cultural scenarios and content has been and continues to be developed for pure entertainment but also for educational purposes. Brusilovsky (2003) proposes the term "adaptive hypermedia" and he presents in his paper several educational projects and systems to build these resources.

Research and development of semantic hypermedia learning objects is greatly associated with theoretical principles from cognitive psychology. Within the vast field of neuroscience, cognitive theory is a topic where there is a lively debate. Nonetheless several recognized researchers as António Damásio (2010) sustains that, for the human mind, it is easy to develop maps of meaning.

> *"In brief, the brain maps the world around it and maps its own doings. Those maps are experienced as images in our minds, and the term image refers not just to the visual kind but to images of any sense origin such as auditory, visceral, tactile, and so forth." (Damásio, Part I, The Framework, para.3)*

The development of such maps is greatly associated with the development of management skills. The main idea is that there is a cognitive advantage when presenting new concepts alongside with other concepts closely associated to it. When proposing a semantic structure, or semantic web, the author of multimedia materials is building a cognitive scenario that will unfold as the learner interacts with the interface.

Brusilovsky (2003) places adaptive hypermedia as an area of research that analyses hypermedia developed with adaptive systems or with intelligent tutoring systems. In both systems information and educational materials are stored in semantic structured databases and are retrieved according to user performance and interaction. The main difference is that in the tutoring systems there is implicitly or explicitly a tutor figure that helps the user along his path.

Many educational projects developed using semantic structuring have consistently presented good results in different educational levels, from K-12 to college and have successfully been implemented in working settings (Engelhardt, et al., 2004; García & García, 2004; Correia & Tomé, 2007). Many projects identified and described by Brusilovsky

(2003) have a semantic structure built into their own software or are programmed with the support of professional teams of designers and programmers (InterBook, Web DCG, AHA!, ACE, ALE, NetCoach/ART-WEB, ECSAIWeb, MetaLinks, SIGUE). The author claims that the availability of these authoring tools is gradually changing the field of research in adaptive hypermedia. In his perspective applications are becoming easier to use and he considers that less prepared teams of content developers and even teachers can now create their own projects. Francisco and Joaquín García (2004) nevertheless disagree with Brusilovsky in what concerns the usability and usefulness of the platforms they analyzed. Analyzing most of the referred systems and some other like HYLOS, they claim that such hypermedia authoring systems are "far too difficult" for teachers to use by themselves. They present their last version of the HyCo authoring tool to be significantly easier to use by professors but still with some reserve. Other applications often used in education are SEPIA and *Storyspace*, and these present some distinctive features for structure visualization and for online collaboration (Bernstein, 2002; Streitz et al.,1992). Many of these learning systems have search engines and multiple ways to navigate existing content. Mialaret (2000) argues about the advantages learning with systems that provide different forms of browsing and retrieving information:

> *"Managing data: storing data in memory, grouping and providing an order to files demands to the student a new way of psychological research activity: the one through keywords. Knowing which keywords are necessary for the use of a data base is equivalent to being capable of imagining the fundamental concepts referring to the subject of interest. It is to be capable of imagining diverse modalities of classification."*[37] *(Mialaret, 2000, pp.81-82)*

As already mentioned hypermedia, and particularly semantic hypermedia systems, are useful within ill-defined knowledge subjects as they facilitate the navigation through large amounts of resources and can deal with higher complexity. Jean-Luis Le Moigne (2007) also values the fluidity and possibilities of knowledge representations. He discusses Jean Piaget's early ideas, supporting the importance of the knowledge production as a process instead of stable construction of information. The author argues for the importance of distinguishing complex from complicated. He presents the idea that some phenomena cannot be simplified although they can, to a certain extent, be intelligible. For example, some phenomena predictability is still not possible to calculate through analytical modeling, however it can be

[37] Translated from Portuguese by the author.

understood and represented showing the essential of its unpredictability. He states that complexity is not necessarily a characteristic of nature but rather the ways in which humans think, as we rely in codes and the development of our own symbols. Driving from this observation, the construction of new knowledge in the comprehension of apparently complex phenomena should imply the creation of new symbolic representation formats. The idea is that by creating better "vocabulary" or symbolic representations or by interiorizing and recognizing the phenomena complexity, it becomes less complicated and eventually less complex. Hypermedia semantic engines can be thought as helpful symbolic representation systems that may be adaptable to describing and representing complex phenomena and in this way contribute to bring light to the interpretation and recognition of complex subjects.

2.2 Action and knowledge construction

Engaging in new teaching and learning approaches to include participatory activities where students may learn and develop their skills within real context of ICT usage, should not be considered merely to follow a popular trend. It should be done with clear perception of the pedagogical advantages and the epistemic implications involved.

Until now we discussed and presented authors that support the importance of having audiovisual and multimedia in the learning environment. The foundations of constructivist theories of learning have been central in the research and discussion of the use of technology, audiovisual, and multimedia until now. They are even more relevant for the development of new teaching and learning activities that build on the active involvement of students as they use technology in the learning processes. It is useful to follow some authors that developed from Jean Piaget and Seymour Papert's ideas to better understand the central role of students in their own educational process.

> *"We understand "constructionism" as including, but going beyond what Piaget would call "constructivism." The word with the* ***v*** *expresses the theory that knowledge is built by the learner, not supplied by the teacher. The word with the* ***n*** *expresses the further idea that this happens especially felicitously when the learner is engaged in the construction of something external or at least shareable... a sand castle, a machine, a computer program, a book. This leads us to a model using a cycle of internalization of what is outside, then externalization*

of what is inside and so on." (Papert, 1990, p.3)

This idea that cognition can be enhanced by the use of tools, simulations, and environments, has been explored in many contexts so far by researchers in the field (Barsalou, 2008a). In the field of cognitive science the debate exists between many theories that can be grouped in traditional theories of cognition, *connectionist* theories and *grounded cognition* (Barsalou, 2012). The traditional or standard theories propose that the brain functions with two distinct systems, one modal system for short term processing associated with perception, action, and introspection (e.g. vision, audition, movement, mental states) and another *amodal* where knowledge is stored in a semantic memory structure. *Connectionist* theories also propose distinct modal systems for long term memory and short term memory one important distinction to make is the nature of the connections between conceptual representations and the different modal systems are not discrete but rather statistical (Barsalou, 2012). An alternative view named *grounded cognition* assumes that all forms of cognition are based in modal representations and therefore associated directly with simulations, situated action and bodily states (Barsalou, 2008a). Many other authors from distinct areas of research have written about the importance of manipulating, objects, systems, networks in the learning process (Reed, 2009; Norman, 1994; Zhang & Norman, 1994; Jonassen et al., 1996). The idea that knowledge and knowledge construction is distributed and not something existing or developing within the mind has been explored by several authors since the nineties. Next, an exploration is proposed of some views evolving from earlier "constructivist" theories to more recent discussions exploring social cognitive theories, collaborative and problem based learning models that support options made in the definition of the learning model for the empirical project further defined in chapter 3.

2.2.1. The constructivist contributions for a learning model

For many years objectivist conceptions of learning were the basis of education and of research in education. Supporters of these conceptions assume that knowledge can be transferred from the teacher or transmitted via some technology to the student. Many authors claim that in education and particularly in higher education, practices are still too based in these objectivist instructional models and methods and there is an urgent need to complement curricula with models that give more relevance to constructivist approaches. Papert (1991)

expresses this idea that offers the foundation for most of the authors discussed here:

> *"I like to formulate a major theoretical issue as "constructionism vs. instructionism". This does not suggest that instruction is bad or useless. Instruction is not bad but overrated as the locus for significant change in education. Better learning will not come from finding better ways for the teacher to instruct but from giving the learner better opportunities to construct." (p. 3)*

According to the constructivist epistemology, knowledge should be seen more as a *project in construction* than a *given* object (Le Moigne, 1994). The interaction between the observer or learner and the observed or subject is considered of major importance. For Le Moigne, knowledge is thus considered as being reliant on the individual. David Gruender (1996) is very critical about this constructivist view that knowledge consists solely of ideas individual people have arrived at, and now possess mentally. That would mean that it certainly does not exist in books or other materials. He believes this to be completely unadjusted as he argues that forms of recording earlier generations' ideas and knowledge allow us to save the effort of repeating all the hard work other generations have already done.

> *"One of the purposes of schooling, and education in general, is precisely to help students to see this previously acquired knowledge as something live and important to them" (Gruender, 1996, p.22)*

Previous knowledge from others together with critical thinking allow us to have "constructive" thinking especially when we find difficult to adjust between the ideas of others and our own reality. From an educational point of view, "learning how to ask critical questions about the work of others, we learn how to do the same thing in the formulation of our own" (ibid., p.22).

> *"Schooling consists in: helping the students create within themselves the necessary constructs, figure out how to learn and critically test new constructs on their own, and record constructs so they can be consulted by oneself and others without being limited by the bounds of human memory." (Ibid., p.26)*

The main idea Gruender (1996) highlights, is that the role of education is to provide rich student and teacher centered designs for action, which take into account the importance of creating, supporting and enhancing active critical inquirers that may be able to interact with each other and the complexity of the world. These designs should be personalized and

adapted to the circumstances. According to Gruender these designs should promote:

- Students' critical thinking;
- Students' creative abilities;
- A variety of techniques and constructs.

Papert (1999) developed much research in the use of technology with children following the work of Piaget. One of the great findings he attributes to Piaget is that "children are not empty vessels to be filled with knowledge, but active builders of knowledge" (Papert, 1999, para.3). One other conclusion Papert gathers from the work of Piaget is that for child development, imagination is more important than knowledge. Nevertheless, he selects as the most important contribution for a theory of knowledge Piaget's notion of epistemic relativism, which supports the co-existence and value of multiple ways of knowing. He claims that it is still widely important in several discussions about "women's way of knowing", "Afrocentric ways of knowing" and "computer's ways of knowing".

Seymour Papert and Idith Harel (1991) present constructionism as a framework where learning and knowledge construction benefits from the notion of action in context. Sherry Turkle and Seymour Papert (1991) simplify constructionism as a theory that supports learning-by-making, underlining two main supporting ideas:

- ***Bricolage as a working strategy*** – where students can let themselves guide by the work as it proceeds instead of staying within a pre-established plan.
- ***Closeness to objects*** – defined as one of the most important parameters to distinguish learning styles. People that have object oriented learning styles require proximity to physical objects. Those that are more at ease with some distance to objects, choose more abstract and formal ways of learning.

Papert and Turkle (1991) focus the importance of the computer for a change in our ways of thinking and, as a consequence, in the way we learn and teach. The authors present several examples from their own studies and in studies developed by other researchers that define two learning styles based in the way people engage with objects. In Piagetian terms, the *concrete thinking* stage develops in close relationship to objects, while the following stage of *abstract thinking* has no dependence on objects and can be completely symbolic. In

a clear critic to the sequential and hierarchical view of Piaget, the authors propose the reevaluation of the concrete and abstract thinking as different styles that have their own value and that have their own importance. The authors criticize the importance given to abstract thinking in most schools curricula as they believe concrete thinking and concrete learning style allows ways of achieving great results in problem solving and in other kind of learning activities. For Papert and Turkle (1991) concrete and abstract thinking demand for different learning styles and different educational approaches. The authors adopt the terms “soft” and “hard” and identify some characteristics of these styles:

- ***Soft*** – Concrete thinking; closeness to objects; undisciplined; emotional involvement, anthropomorphization of objects; flexibility; nonhierarchical categorization; openness to experience of close connection with the object of study. The term also relates to cognitive values based on the ability to insist on negotiation, relationship and connection.
- ***Hard*** – Abstract thinking; distance to objects; systematic planning; logical and hierarchical categorization; rule based.

Learning through design, play and programming are main options in most of Papert’s research. Papert and Harel (1991) present several learning situations in a project that compares the learning outcomes between a class that was engaged for a semester in the design and production of an educational software to teach fractions and two other classes that followed the regular mathematics curriculum. In this study the computer is already seen “as a medium for expression” and as a technology to “think with”. One of the most significant activities made by students in these classes is “thinking about their own thinking and other people's thinking”. The main conclusion of this study is that with this process students “facilitate their own learning”. This activity, as described and analyzed by the authors, promoted:

- ***Metacognitive awareness*** – children's thinking about their own thinking;
- ***Cognitive control*** – planning, self-management, and thinking about these processes;
- ***Metaconceptual thinking*** – children's thinking about their own knowledge and understanding of concepts.

Mayer's *Cognitive Theory of Multimedia Learning* already addressed in the beginning of this chapter also supports the need for the learner to engage in active learning:

> *"Three processes that are essential for active learning are selecting relevant material, organizing selected material, and integrating selected material with existing knowledge. Selecting relevant material occurs when a learner pays attention to appropriate words and images in the presented material. This process involves bringing material from the outside into the working memory component of the cognitive system. Organizing selected material involves building structural relation among the element [process, comparison, generalization, enumeration, and classification] (…). Integrating selected material with existing knowledge involves building connections between incoming material and relevant portions of prior knowledge" (Mayer, 2009, p.70)*

While exploring different approaches many authors support active learning. Some support activities where students develop their own materials with audiovisual and multimedia authoring application (Ohler, 2007) and other propose approaches where students work with existing material adding metadata and annotations (Chambel et al., 2006; Torniai, et al., 2008). All these approaches are developed within a social context that, as many authors discussed, has great influence in a number of aspects like students' performance, outcomes, or satisfaction, and should therefore be considered in the definition of any learning model.

2.2.2. Social cognitive theories and cooperative learning

Social cognitive theories provide an educational framework that takes into account the fact that humans are social beings and that cultural and social interactions influence greatly the way people learn. Albert Bandura is one of the most prominent supporters of social cognitive theories in education. Part of his work was related to the social origins of thought and undertook research on learning by imitation. Already in the 1960's his research lead him to conclude that people learn by adopting others as models (Bandura, 1977).

Presenting several studies on anxiety and defensive behavior, Bandura sets a model of action through which behavior vary, not only by understanding of what is taught, but depend on high levels of expectation. Concerning vicarious learning, Bandura presents several experiments that provide evidence that people learn more when they have some

emotional attachment to those acting as a role model, and get even greater results when people are able to imagine themselves in the place of the model. He then noticed that the levels of arousal should be moderate to optimize vicarious learning outcomes.

He also considered one important factor for people's engagement associated with learning activity, according to him, people motivation can be lead by their expectations motivation. He describes a motivation function that should be managed taking into account the capacity people have to foresee future consequences and "convert future consequences into current motivators of behavior". To what concerns external reward systems Bandura presents money and access to enjoyable activities as most effective and common rewards, but also notices that people will go to great length to secure the positive regard of others or to avoid social censure. In what concerns students' engagement in active learning, many other authors corroborate the idea of the significance of the learning community or larger goals (Jonassen, et a., 1996).

> *"The idea is that learning benefits from a context where the learner is consciously engaged in constructing a public entity" (Papert & Harel, 1991, p.3)*
>
> *"In our experience, design activities have the greatest educational value when students are given the freedom to create things that are meaningful to themselves (or others around them)." (Resnick & Ocko, 1991, p.144)*

Bandura's social cognitive approach can be summarized following most important principles identified by Bertrand (1995):

- ***Reciprocal influence*** – people are not solely dependent on their needs, nor are they automatically controlled by the environment, rather they can, to a certain extent, influence their environment;
- ***Indirect Learning*** – individuals do not have to do things in order to learn, one can learn by observation others doing things;
- ***Symbolic representation*** – humans can imagine the future, set goals for themselves, and act according to this representation of what could happen in the future;
- ***Perception of One's Efficacy*** – people have a certain notion of what their skills, abilities and limitations are, and their action is influenced by their beliefs;

- ***Self-regulation*** – individuals can analyze and have a critic overview over their actions, surroundings and their own thoughts and change their conduct;
- ***Modeling*** – people choose other persons as models and imitate their behaviors even without being assured that these actions will lead to success.

Bandura (1977) believes, that the modeling process, is highly amplified by the mass mediated technologies, and he considers that in the future "electronic media will play an increasingly influential role in the process of intercultural change" (p.55).

Social cognitive conflict theory

Social cognitive conflict theory presents another component of social learning, based in the idea that all learning derives from interactions among individuals and is rooted in confrontation between people's ideas. This theory is based in three principles:

1. Interpersonal interactions are the source of personal development;
2. When several individuals have divergent ideas, they make an effort to seek a balance between these ideas, and this search for equilibrium stimulates thinking and learning;
3. Idea confrontation allows individuals to doubt their own ideas and unite efforts to coordinate their points of view into a new system that will allow them to agree.

Contextualizing their work in the framework of the research on *social constructivist learning environments*, the authors Donald Morrison and Allan Collins (1995) propose to introduce the notion of *epistemic fluency* stating its importance in the design and development of constructivist learning environments. Having as their background the constructivist idea that in complex and multicultural societies as ours, *truth takes many forms*, the authors state that there are different ways of knowing and different ways of constructing knowledge. For knowledge construction to happen, the authors believe, there should be a dialogue where both parts should have in common forms of expression and evaluation and at least one should be able to take the other's perspective. The authors believe knowledge has a structure and one is able to construct and co-construct it with others sharing the same building structures. Learning to learn depends on learning how to *use these knowledge-building structures*. These knowledge-building structures, or "target

structures" that guide enquiry are here called *epistemic forms*. Sharing these forms as well as the sets of moves, constraints, and strategies associated with them (*epistemic games*), are the key elements for creating knowledge in a social environment. As in storytelling, some structure for action as well as some characters are expected to exist, in knowledge construction, some organization and some actions or interaction are expected to take place. Dealing effectively with these expectations requires *epistemic fluency*. Morrison and Collins (1995) propose three basic ways in which technology can contribute for understanding and playing epistemic games:

- ***Communication environments*** – using software environment that allows people "to manipulate symbols and organize textual information" (p.43), in other words, applications that propose epistemic forms to play with, and allow users to fill in the gaps (e.g. *CSILE* [Scardamalia & Bereiter, 1991]; *CoVis* [Edelson & O'Neill, 1994]);
- ***Tools or Construction Kits*** – using computer languages, mathematical modeling environments, and spreadsheets (e.g. *Mathematica*; *Stella*);
- ***Simulation or "Phenomenaria"*** – using digital simulation environments that allow playing or building simulations with a set of already existing objects and watching the development of created scenarios over time (e.g. *SimCity*; *ThinkerTools*; *RelLab*).

To summarize, the authors reinforce the idea that, in this context, a constructivist learning environment is a *community of practice* that has access to some particular set of *epistemic forms* and *games*. The environment gets richer as it allows more interaction between members with different levels of expertise. The authors believe different technologies support different sets of games, which should be used in schools to widen thinking abilities and to allow extending communication beyond the school walls, widening the community of practitioners.

Socio-historical Theory

Lev Vygotsky, although with most of his work developed in the 1930s, has become famous only in the late 1960s, with his socio-historical theory arguing that the development of the human mind is part of a social and historical process. His co-researchers followed his

work and it came to be very important for learning theories in USA. Bertrand (1995) provides an analysis for the three main principles of this theory here summarized:

- ***Zone of Proximal Development*** – defines the existence in each individual of a learning potential that stands between the current development (the student's ability to solve problems by him or herself) and the level of development that allows him or her to solve problems that he or she can develop afterwards when helped by someone.
- ***Link between Growth and Learning*** – states that students have a certain control over their own development. There is no defined link between age and mind development. Leaps in development can be stimulated through learning.
- ***Sociocultural Mediation*** – the learning process development has social and cultural origins. Students adopt the teacher as a model in a social and cultural context that promotes this behavior.

Contextualized Learning Theory

Contextualized Learning Theory defines the social context as a central issue for learning. In the eighties, the term for the group of theories and models that focused in the importance of learning as a social activity was called *situated learning*. A decade after, these ideas were a key framework for the development of online communities of practice. Supporters of contextualized learning theory believe that real situations, with real problems and real interactions provide the best learning environment. Learning in real situations in a community of practice is the best way to learn. For most of the authors, problems presented in school are too *well-defined*, and what is learned with them will probably be of no use in a real-life situation.

> *"It should also be noted that students who do well in school culture (they understand how to answer the teacher, how to answer exam questions, etc.) are not necessarily assured of succeeding in their professional environment." (Bertrand, 1995, p. 126)*

Most social cognitive theories support that the relation between students and professor should be like one of the apprentice and the master. Most of them also support that students learn as they share their problems, their knowledge and discoveries in a

collective approach. Working in-group while guided by the teacher is highly encouraged by supporters of these theories.

Cooperative teaching and learning theories

In the USA most authors and practitioners consider Vygotsky the main reference concerning cooperative learning theories. In Europe though, many claim Piaget as the most influential author, because of his founding ideas of cooperative learning and the clarification of the important difference between learning *from* and learning *with* someone (Baudrit, 2005). Piaget believes cooperation between students gives room to reflection and critical thinking instead of simply accepting information provided by an adult authority. Piaget sets the importance of changing points of view for learning. These ideas are significantly different from Vygotsky's (1978) as he believed that an adult or someone that may play the role of the tutor is required to promote significant learning results in students. Still, the use of cooperation in schools has been supported and discussed by famous authors and practitioners in both sides of the Atlantic (e.g. Dewey, Makarenko) since the beginning of the last century. For cooperation to work in heterogeneous groups Baudrit (2005) describes the need for *functional interdependence* between members ("Intérdependence fonctionnelle"). This interdependence requires some internal coordination between members and requires the development of social skills. Important social skills mentioned are:

- Knowing how to listen;
- Knowing how to express themselves in a discussion;
- People management;
- Overcoming differences and different opinions.

Providing structured activities and establishing special conditions should provide better settings for cooperative learning to occur. If groups are not structured and group members have not acquired the right skills, cooperation can turn out to be difficult and the group may fail to achieve the required goal. To support class activity in group projects or partnerships *cooperative teaching and learning theories* provide framing ideas. Célestin Freinet was one of the first authors writing about cooperative teaching in his earlier publication in 1936-37. Freinet's theory is quite popular as it promotes proactively,

quantitative and qualitative time for direct contact among students providing better conditions for the development of tolerance between students with diverse cultural, economic, social and ethnic background. Main principles are:

- *Partnership* – students learn more in group;
- *Flexibility* – group activities adapt to the circumstances;
- *Mutual aid* – all students profit when stronger students help students having difficulties;
- *Cognitive complexity* – group work provide more variables in action that promotes more complex and stimulating environments;
- *Variety of social situations* – as competition decrease students develop better social skills, tolerance is developed and better psychological health is achieved;
- *Personal validation* – students feel more valued, less alone and better supported.

This cooperative learning theory recommends strategies where it is required to:

- Make each individual responsibly for his or her performance and actions to promote the group activity;
- Make sure students understand and comply with what is expected from them.

To develop these strategies careful planning is recommended and teacher should prepare in advance:

- Structured activities for all classes;
- Specifically defined objectives and procedures;
- Non ambiguous activities, as ambiguity force students to try to figure out the intentions of the teacher;
- Begin with simple activities before proceeding to more complex ones (once students have learned to work as teammates).

Cooperative learning

Cooperative learning is presented by David W. and Roger T. Johnson (1999) not only as a means to an end but also as a final goal. The skills developed in cooperative learning are important skills for lifelong learning and students should be encouraged to

develop them. They should be able to:

- Work on their own project and ignore context without being distracted or interrupted by what other students are doing;
- Monitor one's own progress, pacing oneself through the material, and evaluating oneself;
- Take personal pride and satisfaction from successfully completing the assignments.

Bertrand (1995) points out several author's studies (e.g. Fred Newman, Judith Thompson, Robert Slavin) that discard the applicability or the benefits of using these strategies under certain conditions like for example in classes where students may be very low or very high skilled. One argument against these theories is that most learning strategies are too vague and results are dependent on too many variables in order to draw conclusions.

Baudrit (2005) a strong supporter of cooperative learning argues that for cooperative learning to happen teachers cannot simply join students in groups and expect that they will start learning by themselves. In a study he developed, involving different approaches to cooperative learning theories, he was able to identify twelve different scenarios for group activities and to classify them. Analyzing the resulting reports he concludes that there is already strong evidence to support the success of most models of learning activities. He also arrived to the conclusion that providing structured activities and establishing special conditions should provide better settings for cooperative learning to occur.

> *"Cooperative learning can no longer be considered a simple educational formula where several benefits are expected for students' content acquisition and inter-ethnic relationships. It seems that we now deal with a teaching method whose use requires compliance with basic principles and therefore cannot be achieved based on some kind of improvisation."*[38] *(Baudrit, 2005, p.122)*

Cooperative learning strategies are applied and supported by a growing number of professors and researchers that report increasing success with adopted strategies. David and Johnson (1999) are highly supportive of cooperative learning:

> *"That working together to achieve a common goal produces higher achievement and*

[38] Translated from French by the author.

> *greater productivity than does working alone is so well confirmed by so much research that it stands as one of the strongest principles of social and organizational psychology."(p.203)*

The results of these studies don't so much focus in better scores in the end of year or semester, rather they focus on other kind of achievements:

> *"The research results consistently indicate that cooperative learning will promote higher achievement, more positive interpersonal relationships, and greater psychological health than will competitive or individualistic efforts." (Ibid., p.218)*

In other studies, authors Johnson and Johnson realized how much effort people are able to invest without suffering negative stress situations.

> *"Social support and stress are related in that the greater the social support individuals have, the less stress they experience and the better able they are to manage the stresses involved in their lives. Whenever pressure is placed on individuals to achieve higher and challenge their intellectual capacities, considerable social support should be provided to buffer the individuals from the stress inherent in the situation and to help individuals cope constructively with stress." (Ibid., p. 208)*

Group investigation

One of the most well described and most recognized ways to implement cooperative learning is *group investigation*. *Group investigation* is an activity where students form groups according to common interests in a topic, plan how to research their topic, divide the work, carry out their part of the investigation, and finally regroup to synthesize their work and present their findings to the class. Johnson and Johnson (1999) claim that defining learning objectives should always be the first thing to do when designing cooperative learning activities. After defining learning objectives three decisions should be done:

- Size of the group;
- How students should be assigned to a group;
- For how long should the group exist.

The group size influence must be considered as:

- Larger groups require more social skills and more time;
- Larger groups lead to reduction of student's interaction between each member

and students are less accountable for their work;

- Smaller groups allow easier to identification of students' difficulties;
- Available resources and materials can also dictate group size.

When choosing group assignment methods, the professor should consider that the established goals may require for the group to be more homogeneous but the authors focus mainly on the advantages of having heterogeneous groups:

> *"Students are exposed to a variety of ideas, multiple perspectives, and different problem-solving methods; Students generate more cognitive disequilibrium, which stimulates learning, creativity, and cognitive and social development; Students engage in more elaborative thinking, give and receive more explanations, and engage in more frequent perspective taking in discussing material, all of which increase the depth of understanding, the quality of reasoning, and accuracy of long-term retention." (Ibid., p.21)*

In what concerns the duration of group activities, time can vary from minutes to a whole semester depending on specific goals. While supporting the use of cooperative learning strategies these authors are not claiming that this is the only form of learning available. Competition can also be used complementarily in many learning activities and should not be discarded even in activities with no interactions between students. Although individualism is considered by Johnson and Johnson (1999) to decrease students' effort to achieve their goals, to generate negative interpersonal relationships, and even psychological maladjustment, they sustain that this should not be completely left aside from students' learning experiences. They argue that out of school individualistic learning situations will certainly be part of anyone's life, and therefore students should also be prepared to deal with this kind of situation.

> *"The conditions under which competitive and individualistic learning may be constructive are best met when they are within the context of cooperation. What is learned cooperatively can be reviewed in a fun energetic competition. When students need simple skills and knowledge to contribute to a cooperative effort, individualistic learning may be helpful" (Ibid. p.178)*

As a conclusion from their field work, when applying their views and principles, Johnson and Johnson present a list of learning outcomes presented here in table 1.

Table 1 - Outcomes associated to principles proposed by Johnson and Johnson (1999)

Instructional outcomes provide increase in:	Interaction patterns are stimulated by:	Learning outcomes provide increase of:
• Higher-level reasoning • Retention • Achievement motivation • Intrinsic motivation • Transfer of learning • Interpersonal attraction • Social support • Friendships • Prejudice • Valuing differences • Self-esteem • Social competencies • Psychological health • Moral reasoning	• Giving and receiving assistance and help • Information exchange and cognitive processes • Peer feedback • Challenge and controversy • Public advocacy and commitment • Mutual Influence • Achievement motivation • Interpersonal trust (Trusting and trustworthy behavior) • Anxiety management and performance	• Critical thinking competencies • Attitudes toward subject area • Time on task • Interpersonal attraction and cohesion (empathy) • Social support (altruism, caring and commitment) • Accuracy of perspective taking • Self-esteem • Student retention • Importance of peer relationships

2.2.3. Other contributions for a problem based learning model

As we have seen many learning theories and models have been developed and proposed in recent years. Most of them build on constructivist design principles exploring or emphasizing specific details, as for example social engagement or students' active stance. Being so, it is possible to present some common principles. Merrill (2002) advances five principles:

> "***Problem-centered**: Learning is promoted when learners are engaged in solving real-world problems. (…)*
>
> ***Activation**: Learning is promoted when relevant previous experience is activated. (…)*

> ***Demonstration*** *(Show me): Learning is promoted when the instruction* ***demonstrates*** *what is to be learned rather than merely* ***telling*** *information about what is to be learned. (…)*
>
> ***Application*** *(Let me): Learning is promoted when learners are required to use their new knowledge or skill to solve problems. (…)*
>
> *"****Integration****: Learning is promoted when learners are encouraged to integrate (transfer) the new knowledge or skill into their everyday life." (p.45-50, emphasis added in bold)*

These broad principles not only are part of analyzed learning models but in Merrill's perspective should be part of any adopted learning model. We propose to address these five principles in three moments defined by Terry Mayes. Mayes (2001) also claims that classical constructivist learning models can be adjusted to enhance online learning. He proposes a learner centered model following three essential moments where conceptualization, construction and dialog are reinforced in cycles over time.

- ***Conceptualization*** (activation and demonstration) – is the process of coming to an initial understanding through contact with, and exploration of a new exposition of some kind;
- ***Construction*** (application and integration) – involves some activity in which the new understanding is brought to bear on a problem, and feedback about performance will be gained;
- ***Dialogue*** (problem-centered) – the learner begins to use the new understanding, or to practice a new skill in the context of real application, which implies discussion and reflection of the new understanding.

Activation and demonstration (Conceptualization)

According with the underlining idea of constructivist learning theories, activation supports the need to stimulate students' prior knowledge in other for them to be ready to use it to build new knowledge. Merrill (2002) accentuates the importance of remembering information within an open structure:

> *"Learning is promoted when learners are provided or encouraged to recall a structure that can be used to organize the new knowledge. (…) [Activation] involves stimulating those mental models that can be modified or tuned to enable learners to incorporate the new*

knowledge into their existing knowledge." (p.46-47)

Activation benefits from being done with examples. The *demonstration principle (show me)*, indicates that learning is more effective when the student is not only informed about what a subject is or told about how things are made, but rather shown how things are or how to do something, for instance with the use of examples.

> *"Instruction is far more effective when it also includes the portrayal level in that the information is demonstrated via specific situations or cases."(Ibid., p.48)*
>
> *"… a specific demonstration of the particular whole task similar to those the learners will be able to do following instruction provides a better orientation to the instructional material to follow than a list of abstract objective statements."(Ibid., p.46)*

Roger C. Schank et al. (1999) present the *learning by doing* model that supports the principle of activation and demonstration using stories.

> *"The memories that contribute to our library of cases are of specific events in the form of stories. When there is a story that looks different from the stories we experienced in the past, we adjust our memory structures to account for the new memory and learn a lesson from the explanation we used to make sense of it. (…) The best way to convey information is (…) to embed lessons in stories that the learner can understand as an extension of the stories he or she already knows." (p.177)*

Application and integration *(Construction)*

Application supports that, for learning to be effective, students should practice and actively perform using new information and new acquired notions. This practice can be part of the students' answer to a problem. Many are the learning models that emphasize this principle (e.g. *Active Learning*, *Discovery Learning*, *Learning by Doing*, *Exploratory Learning*). One important idea to consider when applying this principle is that students need to be guided in the application of their knowledge (Vygotsky, 1978). Nevertheless, this application should be used only according to students' needs, and with the intention of providing students' independence.

> *"Diminishing coaching: Learning is promoted when learners are guided in their problem solving by appropriate feedback and coaching, including error detection and correction, and when this coaching is gradually withdrawn." (Merrill, 2002, p. 49)*

When providing support to students' practice the professor should act as a coach. According to Jonassen (1999), the role of the coach is to monitor, analyze and regulate the learners' development of needed skills to perform given tasks or achieve expected results. Nevertheless the coach can also provoke meta-learning skills to provide autonomy:

> *"[A] good coach provokes learners to reflect on (monitor and analyze) their performance" (Jonassen, 1999, p. 233)*

The integration principle encourages professors to support activities where students' skills or results may be shown or shared. For Merrill students should be able to apply their new knowledge in a creative way and have opportunities to reflect and discuss their achievements.

> *"Watch me: Learning is promoted when learners are given an opportunity to publicly demonstrate their new knowledge or skill. (…) Reflection: Learning is promoted when learners can reflect on, discuss, and defend their new knowledge or skill. (…) Creation: Learning is promoted when learners can create, invent, and explore new and personal ways to use their new knowledge or skill. (Merrill, 2002, p.50)*

Bandura's theory also integrates the idea that learners learn more when they create their own learning materials:

> *"A large body of research now exists in which cognitions are activated instructionally, their presence is assessed indirectly, and their functional relationship to behavior is carefully examined. Results of such studies reveal that people learn and retain behavior much better by using cognitive aids that they generate than by reinforced repetitive performance." (Bandura, 1977, p.10)*

Problem-centered and real-world problems *(Dialogue)*

Problem solving has been for many years supported by cognitive psychology research but not always using the same definition of *problem*. For some authors problem solving is engaging in some form of simulation of a situation or a device, while for others it implies some sort of real world task. Merrill (2002) proposes to use problems to include a wide range of activities that can be tasks that may be representative of other tasks that the learner will encounter out of the instructional environment. The main difference between a *problem-centered* approach and a *topic-centered* approach is in the integration of

components. While in a *topic-centered* approach each topic is taught in isolation, in a *problem-based* they are demonstrated as "particular wholes" where elements are interconnected. In *problem-based learning* there is an inversion of priorities. What drives learning activities is not *knowing* the domain content, but rather the goal of *solving a problem*. As Jonassen (1999) proposes:

> *"Students learn domain content in order to solve the problem, rather than solving the problem as an application of learning" (p. 218)*

Alan Schoenfeld[39] (2011) supports that the most important thing in education is that students learn to think as specialists in the specific areas or learning domains they are studying. To solve problems in a specific discipline, students should learn to solve problems like professionals of the field. He proposes a working definition of problem solving stating that people are engaged in problem solving when they are trying to achieve something, and they don't know a straightforward way to do so. To propose autonomy in problem solving Schoenfeld's methods can be diversified according to the subject in hand (e.g. in writing - students can be asked to organize and outline the paper, to use topic sentences for paragraphs and to repeat themselves; in mathematics – students can be asked to draw a diagram, look at cases, solve an easier related problem and exploit the method or the result).

Not all professors support the integration of real-world problems in their classes as some are not confident that their students may be able to find any solution. And the truth is that most "problems in real-life cultures are poorly defined or partially explained" (Bertrand, 1995, p.126). Nevertheless this is why most practitioners and most research support the importance of having problem solving with real-world problems. Not only do they believe that students enjoy "real" challenges but also that it is important for students to learn to deal with ill-defined situations or problems. The answer to some problems can sometimes be so complex or allow for so many different results that some authors find that the goal should not be to find a solution but to propose a project or design it (Jonassen, et al., 1996; Jonassen, 1999; Hannafin, 2002; Mayer, 2009; Nelson, 1999; Schank 1999; Di Marco et al., 2010). In order to guide active learning, students can be led to achieve their goals through a subset of goals distributed in phases.

[39] In recorded conference "Learning to Think Mathematically (or like a scientist, or like a writer, or...)"

Bandura (1977) develops the idea that prior stimuli and response consequences alone don't explain human behavior, mainly because humans have the capacity to represent future consequences in their minds. These representations of future outcomes "functions as current motivators of behavior" (p.161). He explains that most external influences affect behavior through intermediary cognitive process. When goals are challenging and have to be developed through time, self-motivation is best maintained if explicit proximate goals or subgoals are set to auto-regulate reinforcement.

> *"Subgoals help to create present inducements for action, while subgoal attainments provide the self-satisfaction that reinforce and sustain one's effort along the way." (Bandura, 1977, p.162)*

Further developing this idea, Bandura proposes to extend earlier ideas developed by Piaget concerning optimal disequilibrium. Subgoals should be moderately difficult to maintain high effort levels. Nevertheless there should be a balance taking into consideration the learner prior known competences, or else the learner may not even be able to initiate the task. If the learner lacks the ability to set his own roadmap of subgoals to achieve the final goal, some guidance may be required to lead students to see themselves doing the required actions and achieve the goal. Goals and subgoals should not be too easy, as insufficiently challenging objectives will not arise sufficient interest and consequently will not produce enough satisfaction. Bandura, in the same chapter, reinforces the idea that awareness and the aid of thought is key for learning. In project based learning approaches, students may be invited to propose subgoals for each phase of the project, but the teacher should be aware of student's ability to define them properly. These problem-based models generally have a strong emphasis on the application and integration principle, attributing less importance to activation and demonstration. There are, however, many models that sustain the importance of all these phases. For instance the instructional system REALs (Rich Environment for Active Learning), proposed by Scott Grabinger and Joanna C. Dunlap (1996a), encourages autonomy and responsibility from students in the exploration of materials. It responds to complex and ill-define realistic problems, offers opportunity to alter and manipulate with hypermedia applications that help to manage information, and promotes collaboration opportunities for knowledge development through social interaction and negotiation. Grabinger and Dunlap (1996a) claim that:

> *"Hypermedia and multimedia instructional systems can support the implementation of these*

> *guidelines by reminding students that they should consider the connection between old and new knowledge." (p.231)*

However, for them the conceptualization and active knowledge construction process is not over until the students are able to articulate their ideas, perspectives, solutions, products and so on, and have them available for reflection, review, criticism, and use by others.

> *"In fact, students have not really completed the knowledge construction process until they have presented what they have learned to others" (Grabinger & Dunlap, 1996b, p.251)*

As Catherine Davidson (2012) claims, these activities are important for students' academic life but may be considered central for any person to develop skills and attitudes for their life out of academia as autonomous learners.

> "*Most of what we do is precisely about learning as we go, practicing, breaking old habits, learning something else, admitting what we do not know, finding someone who does, getting feedback on a work in progress, failing, trying again, failing even worse, trying again, and so forth. There is no end-of-grade test, there is no grade point average." (Davidson, 2012, para.7)*

Without some kind of exploratory activities, students entering or leaving college may lack the skills to be autonomous learners and take advantage of the internet.

Connectivism

Most learning theories have the central tenet that learning occurs inside a person. George Siemens (2005) claims that constructivist and social cognitive theories fail to recognize the learning process that occurs outside of people. Siemens proposes that in order to upgrade learning theories into the digital age not only technology should be included but also learning activities that include connection making.

There are two central ideas that support the need to focus on connection making. Siemens (2004) refers the need to consider chaos theory that states that meaning exists even when it is not accessible, in these situations learning is the challenge to recognize patterns and existing connections which appear to be hidden.

> *"The capacity to form connections between sources of information, and thereby create useful information patterns, is required to learn in our knowledge economy." (p.5)*

A second idea is associated with the importance of links and connections in people's lives. These ideas drive from the conclusions by Albert-László Barabási that states that nodes value in a network depend on the number and quality of the existing links.

> *"As links and connections take over, understanding network effects become the key to survival in a rapidly evolving new economy." (Barabási, 2002, p.200)*

Considering among other principles explored by chaos, network, and complexity and self-organization theories, *connectivism* is founded on the idea that "learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual" (Siemens, 2005, p.5). The principles proposed in *connectivism* are:

- *Learning and knowledge require diversity of opinions;*
- *Learning is a network formation process of connecting;*
- *Knowledge may reside in non-human appliances;*
- *Capacity to know more is more critical than what is currently known;*
- *Learning and knowing are constant, ongoing processes;*
- *Currency (accurate, up-to-date knowledge);*
- *Decision-making is learning.*

Siemens further claims that knowledge rests in networks and that the "[a]bility to see connections and recognize patterns and make sense between fields, ideas, and concepts is the core skill for individuals today" (Siemens, 2006, p.31). These principles proposed by Siemens make clear that it is important to cultivate the capability to create and maintain connections between sources of information that can be learning communities, people, databases, and so on. His idea is that inside a social network well-connected people are "hubs" who are able to foster and maintain knowledge flow. He proposes that for one to be up-to-date in any field of knowledge a multidirectional ecology should be kept:

> *"Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning to individual." (Siemens, 2005, p.6)*

Since 2005, the definition of *connectivism* has evolved, the most recent description has been proposed in 2009, by George Siemens and Peter Tittenberger:

> *"Connectivism is the view that knowledge and cognition are distributed across networks of people and technology and learning is the process of connecting, growing, and navigating those networks." (Siemens & Tittenberger, 2009, p.11)*

The importance of network for this theory is then strongly based in three aspects. The first is the importance of social networking and participation in the learning process that is increasingly enhanced with available technology in the actual online culture. The second is associated with the way conceptual structure is considered like a network in any field of knowledge. Thirdly this learning theory is strongly based in *cognitive connectionist* theories proposing that at a neuronal level connections are formed as "new stimuli, input, and experiences shape the physical development of the brain" (Ibid., p.12).

2.3 Teaching strategies and systemic overviews

Many authors support the idea that education should contribute to the emergence of new tools for the interpretation and the transformation of reality with the intention of social evolution (Grand'Maison, 2007; Buckingham, 2008). A non-technological deterministic view, supported by Klopfer, et al. (2009), claims that not only should students develop technical skills with the proposed tools, but that those tools should also evolve with the contribution of students, professors and researchers in the area.

> *"Technology can have a reciprocal relationship with teaching. The emergence of new technologies pushes educators to understanding and leveraging these technologies for classroom use; at the same time, the on-the-ground implementation of these technologies in the classroom can (and does) directly impact how these technologies continue to take shape." (Ibid., p.3)*

2.3.1. Teaching and learning in a highly mediated world

Most students in college today belong to a generation born in a digital world and that grew already used to the presence of the internet. This generation is the first to have their children videos recorded in digital formats and is used to having a digital device in their pockets. They started playing with digital games at the same time as with any other games. They learned to read and write on paper at the same time as in computers and

mobile devices[40]. Referring to the "born-digital" kids as the first generation growing up with the internet McGonigal states that:

> *"Most of them have had easy access to sophisticated games and virtual worlds their entire lives, and so they take high-intensity engagement and active participation for granted. They know what extreme, positive activation feels like, and when they're not feeling it, they're bored and frustrated. They have good reason to feel that way: it's a lot harder to function in low-motivation, low-feedback, and low-challenge environments when you've grown up playing sophisticated games." (McGonigal, 2011, p.127)*

One misleading idea that most professors have is that their students, by belonging to this digital generation, already know everything about digital technology. If it might be true that some of them will know what they can do in popular online social networking online services as *Facebook* type interface or in *Twitter*, there will also be many students who never used one or the other. Most students in a regular class probably never heard of applications used to deal with internet feeds (RSS) or with online annotation like *Netvibes, Delicious* or *Diigo*[41]. Every month more applications and plug-ins are developed and presented to the public bringing new services for dealing with online information. It is then practically impossible for students or professors to recognize the best applications for specific tasks, considering that sometimes the best applications can be still unnoticed. One can only try to keep updated in his area of information technology. If half the students never heard about the applications that the professor uses it should not come as strange for them that the teacher does not know about other applications that one or other student might use. In this way, as Wesch (2008) says, professors should not feel that they are less technically prepared than their students.

Most people have the idea that it is difficult to make use of so much online information. This is also a misleading idea. Sites, as the ones mentioned (*Netvibes*, *Diigo*, *Technorati*), can bring to your screen predefined categories of information. For example, if one likes to follow the news from several newspapers, aggregators can pick relevant news

[40] According to several studies in US 99% to 94% of boys and girls under 18 report they play video games regularly.

[41] *Netvibes* is an aggregator which pushes most recent posts from diverse sites or blogs defined by the user. *Delicious* and *Diigo* are social bookmarking websites that allow signed-up users to bookmark and tag web pages and share it with others. In addition, *Diigo* allows users to highlight and make annotations in web pages.

in a specific subject from various selected journals, or eventually be set to present information selected by specific users. Also, search engines are becoming extremely advanced and integrate several features to help the user find what he or she is looking for. People searching online can combine names of specific authors and keywords for learning about specific subjects, in advanced video searches, one can choose clip duration, or publishing dates, and when looking for pictures one can determine image sizes or dominant colors among several other criteria.

> *"Semantic: a word, concept or idea is not just meaningful for what it is, but for how it relates, connects, and contrasts with other words concepts and ideas." (Wesch, 2008)*

The way the internet is evolving allows for users to understand words, concepts and ideas through different perspectives and using different media like photos, videos or text. When preparing students to learn, autonomous learning activities should allow students to face the reality of exploring the internet with appropriate guidance. Wesch claims that, more than ever before, there is a need to support student-centered activities. The professor, instead of providing for all the materials, assignments, and making all the evaluations, should allow activities where roles are distributed. These can take advantage of the fact that the students naturally connect with each other using their own methods.

Supporting student-centered activities in the classroom does not imply a secondary role for the professor. The Professor still has a central role but not so much as a source of information but rather as a model or reference for learning procedures. In a highly mediated world, instead of the professor providing all the answers, he or she may try to redirect the students to other sources of information and knowledge. Those sources can be experts, online resources or other students more advanced in the topic. With this configuration, the professor helps the learner to create his or hers personal learning environment, besides being a close-by specialist that can provide advanced information and recommendations. He or she is more than a guide or tutor in this transition from a closed environment of the traditional classroom to an open and complex online environment where resources and influences can be messy, inaccurate and misleading. Etienne Wenger gives great focus to learning communities as key elements for most of the learning that is taking place in the world. For Wenger (2002) it is clear that no one can have all the information about a certain area of interest or specialty, as there is already so much knowledge in certain fields that only through being in a community

one can be sure to be up-to-date or to have the correct information.

2.3.2. Managing the levels of media and technology

Many authors support that, sometimes, in order to explore contemporary problems, students need to explore contemporary tools as, for instance, the internet.

> *"The network is becoming the favorite mode of action of the era of intelligence, of complexity" (Hervé Sérieyx cited by Musso, 2013, p.36)*

Pierre Musso (2013) explores the trend of dealing with complexity and the confidence some authors find in using the new network paradigm. He claims that there is a strong generalized faith in the possibilities allowed by the internet and networking in many fields of cultural and socio-economics. Musso (2013) claims these believes bring false expectations that regularly support new policy and people's investment in technology. He proposes the term *retiology:*

> *"Retiology is an ideology with utopian aspirations, which is limited to the fetishism of technical networks, particularly Internet. Whether it be literary fiction, futurology or socio-economic analysis of the 'network society', retiology is constantly heralding socio-technical 'revolutions'". (p.48)*

Managing the levels to which students are exposed to computers and the internet in the classroom should be careful, though the classroom may present the best place for students to learn how to be conscious users instead of mainly passive users. The introduction of "new" technology and innovating pedagogical approaches to technology should take into account students beliefs and habits. Although considered now a powerful media, internet and web technology, should not be offered as the answer to all problems. History has taught us that too much enthusiasm can be counterproductive. Computers and networks have their history, J.C.R. Licklider and Robert Taylor (1968) already in the sixties envisioned a bright future mediated by computers. Many people after more than 50 years still question if this "future" has arrived.

> *"Men will be able to communicate more effectively through a machine than face-to-face… life will be happier for the online individual because the people with whom one interacts most strongly will be selected… communication will be more effective and productive, and*

therefore more enjoyable." (Ibid. p.13)

We further propose a short review of the latest developments concerning the adoption of technologies and the teaching and learning approaches that have contributed to our present practices and that are already part of the aspirations of professors, students and institutions.

Learning Management Systems (LMSs)

With the turn of the century, the discussion about online learning communities has increased intensity in the field of learning research, as the promise of distance learning seemed to have failed. Ample literature in the field studied issues concerning student persistence and level of attainment regarding such online learning communities (Noble, 1998; Zemsky & Massy, 2004). In many cases distance learning courses dropouts reached up to 50% and 80%. Many reasons were pointed out as a cause for less successful results concerning distance learning and e-learning in general. Some of these reasons were already addressed in the introduction and can be summarized in three unfulfilled expectations.

Entrepreneurs believed that their first programming modules and "learning objects" developed professional teams of designers, pedagogues and programmers would be easily accepted by students and professors. It turned out that most of these tools failed to prove their simplicity and most professors and students did not recognize that the initial effort would be compensated.

E-learning solutions were not as welcomed by students as expected. The idea that students would engage with computer-based learning as they do with games and other applications proved to be incorrect. Forums with teacher control, certain type of games, simulations and tools for problem solving are not the favorite type of learning solutions for most students. Some methods, nevertheless, proved to be very successful in engineering schools. There was a conviction that e-learning would provide the right stimulus to change pedagogical approaches. Teaching habits are not as easy to change. Most e-learning solutions developed proposed different learning paradigms like student adjusted and student centered learning. Nevertheless it seemed that for such models to work, students needed to acquire in advance critical thinking and self-organization skills.

As already mentioned, in Universities where much investment was done with the

installation of LMS most professors actually only use them to post files with their lecture notes translated into *PowerPoint* presentations, distribute class materials, grades and assignments. Most communication tools as forums are not used, or poorly used, mainly as one-to-many e-mail delivery systems (Fidalgo, 2012). This reality nevertheless is changing gradually. LMSs are being increasingly used, and their potential is recognized by professors and institutions while their interfaces are evolving to more user friendly solutions[42]. Although there are many professors that are now using *Web 2.0* services and applications available in the internet like blogs, *Google apps* or *Facebook* there are still many features and advantages that only an integrated LMS can provide (e.g. restricted access, grade management, integration with institutional grade systems, personalized logs, reliability). Even if LMSs adoption is not as enthusiastic as many envisioned, the number of users and institutions adopting them is still growing. *Moodle,* for example, is one of the most used LMSs in the world and it almost doubled the number of registered organizations and users in the last two years[43].

E-Learning 2.0

Although most LMSs integrate forums, blog type pages, wikis and chat rooms, many professors still opt by using their own autonomous solutions. Many professors also incorporate, as part of student work, the use of *Web 2.0* services as a way of facilitating communication and cooperative practices in their work.

> *"With e-learning 2.0 students collaborate with peers to create content and a learning network where it can be distributed." (Fidalgo, 2012, p. 21)*

Stephen Downes (2005) proposed the term *e-Learning 2.0* as a way to connect the shift from a professor centered use of technology to a new, distributed way of e-learning where a set of open-source applications is used by both professors and students instead of the institutional LMS platforms.

The idea most professors have when using *Web 2.0* as part of class activities is to bring to the classroom popular social networking environments that students already use, or quickly learn how to use, and that they may then use in the future by themselves.

[42] Moodle for example is one of the most used LMS throughout the world. It has a strong community of voluntary developers and is a robust open-source platform able to manage a varied set of standards and compliant with a considerable number of online services and applications (https://moodle.org/).
[43] Moodle Wikipedia page (http://en.wikipedia.org/wiki/Moodle)

Supporters of *e-Learning 2.0* claim the importance of combining the collective work within the creation of one's own identity. Identity construction processes in online environments has been considered of great relevance since Sherry Turkle's famous book, published in 2005, "Life on screen". Inside an online learning community most users have the opportunity to awaken and create their own identity. The learning network that is created in personal learning environments (PLE), within *Web 2.0* platforms, or other networks with identifiable properties, foster diversity, autonomy and reliability for the students in their learning and knowledge construction (Downes, 2007).

The challenge of many researchers and practitioners is to develop teaching and learning strategies that can nurture meaningful learning within familiar environments, and trigger new skills for using and understanding digital media. For Patti Shank (2008) the idea is to develop teaching strategies that promote the development of students' skills to search and research information, to find and validate useful resources and to develop their own PLE, where they may share and discuss ideas. Developing resources and sharing them, is part of the learning process. As Shank (2008) states, "people are not only assuming the role of learner, they're increasingly assuming the role of instructor as well" (p.244). For him, learning is increasingly a social activity, and managing our social network is part of maintaining our PLE.

Some Universities and professors are already taking up this challenge and "see a need to provide technologies and instruction to students along with pedagogies designed to make students more canny about issues of reliability, credibility, access, security, privacy, intellectual property and so forth." (Ryberg et al., 2011, p.182)

> *"Driven by a mix of market demand and comprehension of the learning potential of new media, universities are coming to embrace new modes and forms of learning." (Ibid, p.182).*

Massive Online Open Courses (MOOCs)

Many authors are now optimistic believers in the *Massive Online Open Course* (MOOC) model to support to high-quality education at a low-cost. Other authors, like Howard Rheingold[44] or Cathy Davidson,[45] show their concerns about the need to provide

[44] Howard Rheingold and Bryan Alexander discuss on MOOCs in a short video (http://bit.ly/164zJTF)
[45] Cathy Davidson post commenting recent announcements regarding the pilot program between San Jose University and Udacity a platform for MOOC development and the president Obama Speech on higher

students with the skills to engage and succeed in this kind of self-learning environments. These authors, along with many others, discussed the need for some kind of guidance that most students, if not all, require in order to be able to use the internet appropriately (Ryberg, et al., 2011; Davidson & Goldberg, 2010; OECD, 2011).

With the increase of user-friendly tools for communication and a change in what several authors claim to be a much more participatory culture, the investment and interest in online learning solutions is now high. The interest is now on the so-called MOOCs. However, MOOCs are not so different from early open online courses. There were many courses in the beginning of the century that combined short videos, automated/self-assessment, forums and ultimately open online materials. Also, the number of participants was high, for instance in England and in China, in several open language courses. In essence, it seems that what is really new is to have these courses within new systems with refresh interfaces[46] and provided by the world's leading higher educational institutions (Glance, et al., 2013). Glance concludes that the learning model foundations are not much different. Although these authors support that there is no reason for MOOCs to be less efficient than face-to-face learning, there is still few research supporting MOOCs and insufficient discussion considering the real impact of this kind of educational model. Dropout numbers are still very high and many authors question the real impact of such courses (Meyer, 2012).

> *"In total, roughly 5 percent of students who signed up for a Coursera MOOC earned a credential signifying official completion of the course" (Koller, et al., 2013)*[47]

Some authors believe that the model can be improved, but that high dropout rates should not be the primary concern. As the figures show 5% dropouts from 100.000 students enrolled, this number is still higher than what the number of students any teacher is likely to teach in 10 or 20 years. In the other hand, some of the students involved would not have had the opportunity to learn in any other way (Glance, et al. 2013).

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education funding (http://t.co/XkxJW5Ccec)

[46] Many of this system for instance have interfaces more oriented to the use of video that was not common in earlier LMSs (e.g. Iversity).

[47] Coursera is a company that supports their own courses and courses done with partner education institutions.

Face-to-face e-learning

The idea of losing face-to-face contact with professor and students, tempting as it may be if only economic factors are considered, is still far from being widely supported or even desirable. Most authors only support distance learning education (DLE) as long as no other options are available and when the investments are useful to complement face-to-face learning. Several professors and researchers support this view of complementing face-to-face learning with online communication as they allow new decentralized opportunities of communication using diverse tools as forums, wikis, blogs, etc. In the words of Bonk et al. (2001):

> *"The utilization of peers in online instruction is also one way to reduce the heavy workload on the instructor or trainer, thereby enabling him or her to focus attention on key individuals in need of help." (p.80)*

Many authors alert that technological options don't necessarily imply significant changes in pedagogy. Barry Jackson and Kyriaki Anagnostopoulou (2001) made a review of several papers and other references on Learning Management Systems (LMS) and arrived to that same conclusion:

> *"The evidence of this study suggests that pedagogical practice and, more importantly, pedagogical conceptions are not necessarily changed by the use of online approaches." (p.53)*

After analyzing several models of online courses in distinct platforms, the authors arrive to the conclusion that different platforms are not really *better* or *worse*, they mainly have different characteristics that make them more adaptable to different kinds of styles of teaching and learning. They believe that what is important is to choose the right strategy for each learning goal, and that, if the pedagogical model is well set, the technology can be in most cases irrelevant. The focus, they continue, should be the students' approach to learning activities. In other words, the learner perspective should always be considered the priority. This perspective may be the only possible, when analyzing the reality of most schools and universities. Institutions change very slowly compared with what happens with technological and cultural trends. Old habits are difficult to change and when specific applications or technological systems are adopted, many professors miss the real benefit that these may provide. Some systems may be better for different purposes and many times it falls to the professor to understand exactly which instructional or learning strategies to adopt within a

specific system to help dealing with a specific problem. Bonk et al. (2001) presents four online based learning situations that reinforce four main roles that should be balanced according to components that integrate any post-secondary online learning activity:

1. **Facilitator** (pedagogical component) – should present problems, foster peer interaction, encourage perspective taking and peer feedback;
2. **Moderator** (social components) – should create friendly, casual and nurturing environment (e.g. online cafes, provide personal stories, jokes), ask students to develop their online profiles;
3. **Manager** (managerial components) – should coordinate assignments (e.g. set due dates, assign partners and groups), Manage discussion (e.g. Organize meetings times and place, set office hours);
4. **Technical assistant** (technological components) – should assist user problems, diagnose and clarify problems, notify if servers are down, explain system limitations, etc.

Such technologies, environments and processes used in distance or online learning can be used in face-to-face learning situations and contribute to hybrid situations where professors and students can benefit from extra resources, editing tools and communication services to learn with.

More digital media procedures less technical apparatus

One way to ease the overload of technology in the classroom can be to control the burden of technical details in the student's learning process. This idea expressed by Miles is an example of how the professor may deal with the difficulty of having digital media based activities in the classroom without having the emphasis on technology. In his view, students should be motivated to develop "Sketch Dirty Noisy Media". The idea is to simply suggest the use of any digital hardware and software that students may have at hand. In his webpage "Sketch Dirty Noisy Media"[48] he says:

> *"When they [his students] ask why [to Sketch Dirty Noisy Media]? Which they do. I answer because:*
>
> - *we can*

[48] *Sketch Dirty Noisy Media* web page (http://vogmae.net.au/piv/sketch-dirty-noisy-media)

- *if you can't make good work with your phone/still camera then using a $20,000 camera and $10,000 worth of lights is not going to help*
- *artists sketch and writers take notes to learn their craft, so now you can do the same since you really don't need to wait to get the $20,000 camera to learn how to compose, frame, shoot and cut work*
- *if something important happens are you not going to record it because you don't have your 'pro' gear?*
- *the difference in scale, between imposing yourself upon the world with a script, crew, cast, sets, props, versus learning how to look and make with what is around is a difference worth beginning to wonder about and pursue*
- *that learning how to look and make with what you have available includes, expresses, is the beginning of an ethics of making grounded in the world"*

With this method, students are encouraged to use their own hardware (e.g. cellphone, digital camera or laptop) and are free to choose applications or services they already use or which they empathize with (e.g. blogs, video editing application, animation editing application). Professors should know of and recommend good tools for accomplishing the proposed goal but they don't need to know about all the good applications in the field. Some authors support that most students won't need much teacher support for technical issues:

> *"It's not important that teachers be advanced technicians. Their students will cover that for them. Students have the luxury of time and well-developed informal learning communities to keep up on the latest and greatest happenings in the technology worlds. What is important is that teachers be advanced managers of their students' talents, time, and productivity. They need to be the guide on the side rather than the technician magician." (Ohler, 2007, p.13)*

However, Miles (2008) finds students often confuse "learning the 'tool' and learning what can be done with the 'tool'" (p.17) and he believes that helping students to make this distinction is the important challenge for any professor teaching technologies in networked and integrated media context. Miles also sees his role in class as a facilitator and a provocateur rather than a content expert. In his class "students are given time and resources to make connections themselves" (Miles, 2009b, p.222). Miles is more interested in supporting meta-learning skills as he states in a chapter entitled "Hypertext Teaching":

> *"I am a teacher who employs an explicit process based pedagogy where a great deal of what I teach concentrates on a variety of 'meta' questions and problems around how we learn, why we are learning what we are, and ways of grounding what is being learnt into the everyday professional and life worlds of the students." (Miles, 2009b, p.222)*

2.3.3. Involving students in their own educational experience

Traditionalist theories of education value the definition of a set of knowledge that teachers are supposed to teach and students are supposed to learn. This vision is contrary to the majority of learning theories and approaches that propose less rigid curricula and prefer to orient teachers toward the development of skills and values.

> *"What are needed are 'designs' which could supply a variety of techniques in different kinds of circumstances to different learners and teachers, and designs which strengthen the critical and creative abilities of students - in short, designs which are not authoritarian." (Gruender, 1996, p. 27)*

If most technological educational theories support learner centered approaches the truth is that there are many different approaches (Hase & Ellis, 2001). Some authors, as Stewart Hase and Allan Ellis, support that not only there is a need for universities to adapt to learner-centered pedagogies but that they should adopt for open-ended learning strategies where the learner manages and control their own learning as the best way to stimulate lifelong learning skills. As we have seen, many authors support that hypermedia technology has evolved to allow supporting cognitive processes. Not only as mere navigation aids but as complete cognitive tools. Several authors argued that when students assume the operating control to develop their own path and learning story a significantly positive shift occurs (Liu & Bera, 2006; Iiyoshi & Hannafin, 2002). Preparing students for autonomous learning activities should allow students to face the reality of exploring the internet with appropriate guidance. This kind of activity is still missing from most schools and several reasons may happen for this to happen. Lack of time to engage in exploratory activities, or professor concerns of having their authority questioned, or being intimidated with online contradicting information, or eventually the belief that information on the subject of his class in not appropriated. Sugata Mitra is another known supporter of self-organized learning methods but he is also a supporter of the fundamental role of the teacher and the

importance of peer-to-peer learning.

In order to develop new types of knowledge different strategies are necessary. Many students can easily memorize facts. But isolated facts may not contribute for students' knowledge of other areas and it may be difficult for students to ever apply said knowledge. This is what is called *inert knowledge*. *Inert knowledge*, in other words is the knowledge that students cannot access or use appropriately. One other problem is that most students do not readily engage in intentional, self-directed action to acquire knowledge. Most people are passive learners. For example, students don't regularly use diversified learning strategies because they do not know much. Learners often dismiss that there are two fundamental aspects for the learning process:

- *Remembering* – they know little about the strategies and tactics of overcoming memory limitations;
- *Monitoring* – they do not think to orchestrate, oversee, plan, and revise their own learning activities.

To activate learners, and to promote good memory strategies, teachers should incite students' curiosity, and provide activities that show them how to structure and strategically support their learning activities. Many authors support the idea that it is fundamental that students understand how they themselves learn. This type of knowledge is called metacognition.

> *"If metacognition is the missing link, let's train it. (…) it turns out not to be easy to train a learner to be strategic, to select cognitive activities intelligently, to plan, to monitor, to be cognitively vigilant, economical, and effective!" (Brown, 1992, p.146)*

In opposition to the traditional learning model, Brown proposes the design of intentional learning environments where students assume the role of researchers and teachers and monitor their own progress. In these learning environments, the teacher guides students' through discovery activities. Developing thinking skills is the main goal. If content is to be studied in depth it requires understanding, and students' capacity to explain it with coherence in the end. Computers assume the role of tools for intentional reflection, learning and collaboration. Assessment is based on performance, project development, and the elaboration of a portfolio. Brown (1992) supports student autonomy in the development

of their own learning project:

> *"In order to foster a community of learners that features students as designers of their own learning, we encourage students to be partially responsible for creating their own curriculum." (p.150)*

Rosado & Almeida (2005) clearly propose metacognition as a challenge for educators. They say that in order for teachers to develop metacognition competencies in their own learning they have to be metacognitive themselves in their teaching. Teachers concerns should focus on the pertinence of the proposed contents, the sequence of their presentation and the teaching/learning method. Focusing on John Biggs's work, these authors use the term *meta-learning* as a learning activity that involves work done by students while they find for themselves the ways to improve their learning strategies. Biggs and Tang (2007) propose yet another term, *reflective learning*, describing what learning students are able to do when they develop "a sound knowledge base and use reflective or metacognitive skills to work strategically toward solving novel problems, to self-monitor their emerging solutions" (p.150). They propose a list of questions that learners should consider when facing these novel problems or situation:

> *"This is a 'fuzzy' problem; how can I reformulate it in a way that relates to first principles leading to good solutions? What do I know that might be relevant? What problems like this have I met before? What did I do then? How can I find out further information? From where? How do I test it? I'll try this solution; does it work? How could I improve it?"(p.151)*

Along with self-organizing skills the learner should have self-evaluating and self-monitoring abilities. This form of learning can also be done in groups, thus requiring the need for peer-assessment skills.

2.4. Digital media literacy: skills and attitudes

As already mentioned, along with the growing use of ICT in schools and universities much literature now exists describing its uses to support literacy. Nevertheless, many authors recognize the limitations of traditional research literature about what are or should be considered the new literacies (Jenkins et al., 2009; Leu et al., 2004; Lankshear &

Knobel, 2010).

Leu et al. (2004), illustrate how history teaches us “literacy and literacy instruction have changed regularly as a result of *changing social contexts* and the *technologies* they often prompt.” (p.1574, emphasis added). The authors present a historical vision that includes productivity demands or efficiency in the economic development but is also punctuated by episodes associated with cultural context of control and issues of empowerment. In their chapter, Leu et al. (2004), it becomes clear they believe that the most important social forces at work today are governed by a “global economic competition within economies based increasingly on the effective use of information and communication” (p.1575). The most recent OECD report on adult skills, from 2013, focuses exactly in this aspect of the required skills for information processing. Besides interpersonal communication skills, the need is acknowledged for various other more generic skills. These “generic” skills include self-management and the ability to learn. This ability to learn is associated with the market for people that can rapidly adjust to uncertainties. The kinds of literacies included here seem to go beyond the so-called classical literacies, reading and writing or even audiovisual and technological literacies. With the internet and digital devices and the correspondent convergence of accessible media many authors use the term digital media literacy.

The following section proposes a discussion of media literacy that explores different views of what skills should be supported by both schools and society and to what extend should new literacies be different or extend the traditional ones.

2.4.1. Redefining media literacy in a digital world

There are now many competing definitions for literacy. Since the 1990’s that the discussions about literacy include “media literacy”. From a concept used in the fifties, “media education”, associated with the importance of using media in education to learn (e.g. using TV, movies) the discussion in the nineties begun to develop into a process of learning for the media. Media literacy would thus include the ability not only to passively understand media, but to actively create or produce content. The first time the term is used by UNESCO (1990) it already includes this idea of participation:

“There is still much discussion on whether the correct term is "media education," "media

> *awareness," or "media literacy." It feels like "media literacy" will win out because of the mental association with "literacy" meaning the ability to "read" and process information in order to participate fully in society." (UNESCO,1990, p.1)*

In an UNESCO event in Paris, in 2003, 25 experts voted for a definition out of three previously selected from reference edition, and the majority of them selected two definitions that clearly support the idea of the need of participatory capacities in a media literate person:

> *"The media-literate person is capable recipient and creator of content, understanding sociopolitical context, and using codes and representational systems effectively to live responsibly in society and the world at large" (International Encyclopedia of the Social & Behavioral Sciences. Vol. 14 / Eds.N.J.Smelser & P.B.Baltes. Oxford, 2001, p.9494)*

> *"Media literacy, the movement to expand notions of literacy to include the powerful post-print media that dominate our informational landscape, helps people understand, produce, and negotiate meanings in a culture made up of powerful images, words, and sounds. A media-literate person — everyone should have the opportunity to become one — can decode, evaluate, analyze, and produce both print and electronic media"(Aufderheide, P., Firestone, C. Media Literacy: A Report of the National Leadership Conference on Media Literacy. Queenstown, MD: The Aspen Institute, 1993, p.1.)*

In this meeting many participants offered other definitions and references to be discussed which corroborates that a definite definition simply does not exist. Still, one other activity developed in this meeting, allows bringing forward what was the most important skill associated with media literacy. In a list of eleven main purposes of "*media education/media literacy*", the experts ranked higher the purpose "to develop person's critical thinking/autonomy" (Fedorov, 2003, p.7). These approaches to a definition of media literacy while considering participation and critical thinking seem to disregard the relevant aspect of an emergent, at that date, digital culture. In 2007, the European Commission explicitly added the internet and digital technologies in the definition of media literacy:

> *"Media literacy may be defined as the ability to access, analyze and evaluate the power of images, sounds and messages which we are now confronted with on a daily basis and are an important part of our contemporary culture, as well as to communicate competently in media available on a personal basis. Media literacy relates to all media, including*

television, film, radio and record music, print media, the internet and other digital communication Technologies"[49]

Also in a final report of a study requested by the European Union, media literacy is seen as the most inclusive form of literacy assuming that other literacies as classic literacy, audiovisual literacy and digital literacy are part of it.

"Classic literacy was dominant for centuries and corresponded to the process of reading and writing, and in which primary schooling has played an essential role.

Audiovisual literacy, which relates to electronic media such as film and television, focuses on image, and sequential images. It is the beginning of different educational initiatives early engaged but not sufficiently supported by a real policy.

Digital literacy or information literacy stems from computer and digital media, which brought about the necessity to learn new skills. This is a very recent concept, and is often used synonymously to refer to the technical skills required for modern digital tools.

Media literacy, which is needed as a result of the media convergence – that is the merging of electronic media (mass communication) and digital media (multimedia communication) which occurs in the advanced stages of development of information society. This media literacy includes the command of previous forms of literacy: reading and writing (from understanding to creative skills), audiovisual, digital and the new skills required in a climate of media convergence."

A media literacy experts group from the European Commission reinforced *awareness* as a central issue in media literacy:

The aim of Media Literacy is to increase awareness of the many forms of media messages encountered in their everyday lives. It should help citizens to recognize how the media filter their perceptions and beliefs, shape popular culture and influence personal choices. It should empower them with the critical thinking and creative problem-solving skills to make them judicious consumers and producers of information. (Media Literacy Experts Group, 2009, p.13)

They extend media literacy as instrumental in building and sustaining democracy as "one of the key pre-requisites for active and full citizenship" (Ibid., p.13). Authors such as Henry Jenkins et al. (2009) also support this idea of new media literacies arching over

[49] European Commission quoted from a report for the European commission by Paolo Celot (2009)

the previous ones. In the white paper "Confronting the Challenges of Participatory Culture: Media Education for the 21st Century", Jenkins and his coauthors use the term *new media literacies* and discuss the skills needed to fully participate in the new media culture where participation assumes a central relevance. These new skills are built "on the foundation of traditional literacy, research skills, technical skills, and critical analysis skills" (ibid., p.4). For these authors textual literacy (reading and writing) comes before everything else, and remains a central skill:

> *"Before students can engage with the new participatory culture, they must be able to read and write. Youth must expand their required competencies, not push aside old skills to make room for the new. Second, new media literacies should be considered a social skill." (Ibid., p.19)*

One important aspect of this participatory culture today has much to do with the use of internet and mobile technologies but also new formats as computer and video games. Looking beyond game statistics or the revenue the industry generates Craig Watkins (2009) focus in what kinds of experiences games facilitate. He shows how young gamers don't feel as simple "consumers of media but also as creators and participants in media" and how games provide them with great opportunities to socialize with friends as many of these games allow much interactivity and voice communication between gamers. Analyzing the way young people are consuming and mixing many layers of digital media, Lessig (2008), introduces the idea of a "remix" culture where the internet opened to the masses the possibility of rewriting with media. As he puts it, "remixed media may quote sounds over images, or video over text, or text over sounds. The quotes thus get mixed together. The mix produces the new creative work – the 'remix'." (Lessig, 2008 p.69)

To rethink media literacy, aside from textual literacy, there is a need to, side-by-side, develop visual literacy, audio literacy, audiovisual literacy, multimedia literacy and game literacy and overall research skills and social skills.

Visual literacy and audio literacy has much to do with interpretation and reproduction of images and sound but, as with textual literacy, interpreting and reproducing is not enough. To be able to actively participate, people have to have technical and critical capabilities to use the necessary tools to create and express themselves using the same media. Exactly the same

happens with audiovisual, multimedia and game literacy. Media literacy objectives should provide an instrumental and practical education to allow the understanding of the building blocks of "motion pictures", how are these created and how can one develop their own audiovisual materials. As with literature, it is important to understand important elements of narrative and how they are set to engage people as they do. With multimedia and games, users should understand how interactivity combines with narrative and how game strategies work to engage people. Interpreting and developing multimedia and games requires users/designers to develop notions of multi-linearity and the development of rules and processes. Multimedia and computer games development also demands particular concerns with the creation of screen interface designs. All these skills and know-how may seem overwhelming and developing these competences to be impracticable. Most authors agree that these are competences that young people don't develop on their own and therefore the important role of schools and universities. With proper guidance and well designed activities these skills may however be acquired. Reading, understanding, and writing skills with different media may still not be enough if one does not have research skills for having access to the appropriate materials and tools.

Increasingly reports from government bodies as well as non-governmental organizations seem to focus on information technology (IT), valuing the technical or operational competences with computers and the internet to process information. Lankshear and Knobel (2005) analyzed several reports and concluded that policy groups focus on "the ability to evaluate information by examining sources, weighing up authors credibility, gauging the quality of writing and argument building in an online text, judging 'truth value' of text found online and so on" (Lankshear & Knobel, 2011). In their perspective this epistemological priorities don't "pay sufficient attention for the importance of social relations in developing, refining, remixing and sharing ideas in a fecund and replicable ways" (ibid., p. 243).

The social skills mentioned by Jenkins et al. (2009) are the core skills for adequate media literacy. Once again the focus should not be the technology but rather fundamental aspects of a cultural change that authors as Jenkins, Lankshear, Knobel and Davidson identify as *participatory culture*. Jenkins et al. (2009) do not marginalize technical skills. These should also be taught in schools, as these authors argue that students "need to know how to log on, to search, to use various programs, to focus a camera, to edit footage, to do some basic

programming and so forth." (ibid., p.20). But because technologies are such a moving target "it is probably impossible to codify which technologies or techniques students must know" (ibid., p.20).

> *"[S]tudents need to know how to access books and articles, to take notes on and integrate secondary sources, access reliable data, read maps and charts, to make sense of scientific visualizations; to grasp what kind of informations are being conveyed by various systems of representation, to distinguish between fact and fiction, fact and opinion; to construct arguments an marshal evidence."(Ibid., p.19)*

Critical thinking skills are also part of their concerns:

> *"Students also must acquire a basic understanding of the ways media representations structure our perceptions of the world; the economic and cultural contexts within which mass media is produced and circulated; the motives and goals that shape the media they consume; and alternative practices that operate outsider the commercial mainstream." (Ibid., p.20).*

Also here new media literacies should be taken as an expansion of, rather than a substitution for, mass media literacies claimed in the past decades by media literacy advocates.

Many authors use the term *new media literacy* (Jenkins, et al., 2009; Lankshear & Knobel, 2006) in opposition to the *traditional mass media literacy*. This option goes along with the idea that traditional mass media influence is decreasing and that the new forms of media culture are not as much influenced by previous one. Wish might not be entirely the case. Also some authors refer to new media associated with ways of using new digital architectures and new information formats and devices (Lankshear & Knobel, 2011). As already mentioned in the introduction, the idea that we are in a new culture or in a new society or that we are in the verve of a shift is still widely debatable and for that reason it is here proposed the term already used by Buckingham (2010) or Dezuanni (2010), *digital media literacy* as to focus on things that people can now do with digital formats. As Buckingham (2010) outlines, children outside school are engaging with these media not as technologies but as cultural forms: they are not seeing them primarily as technical tools, but on the contrary as part of their popular culture, and of their everyday life experience. Even for older generation some things as creating hypertext or attributing metadata to files is not new as already in the 1950s these could be done. Many other authors (Lessig, 2008, Lankshear & Knobel, 2010; Jenkins, et al., 2009; Wessels, 2010),

again recalling Dewey's ideas, support having more popular formats in the classroom in order to provide engaging and at the same time familiar (at least to students) tools and environments.

> *"[T]he "educational" and the "popular cultural", and the "conventional and the "new" can be brought into productive conversations and complementary relationships. This can happen when educators understand the differences and the overlaps, and can see where learner interests and capacities can be built upon for educational purposes." (Lankshear & Knobel, 2006, p.260)*

> *"Development of ICT in education involves not just implementing the technology, but embedding ICT within a broad learning environment. This environment extends beyond the school to the socio-economic and cultural contexts of pupils and their families and aims to support people in learning at school age and beyond, to lifelong learning." (Wessels, 2010, p.97)*

Nevertheless, their idea is not simply to keep up with the evolution of technology as something that evolved apart from what people do with it. As Buckingham (2010) claims, to bring theses popular media to schools, educational activities should provide students with means to understanding them. Using familiar environments (e.g. video games, *Facebook*) in the classroom should be carefully considered. Aside from the risk of converting the classroom into a "playground", one should consider that encouraging popular culture is quite "distinct from and different than" education (Lankshear & Knobel 2011, p.259). Authors as Douglas Rushkoff (2011) and Lev Manovich (2013) go even further in the support of policies to empower students as active developers in the realm of technology. Opposing the technological deterministic approach they support that students should have more knowledge about what governs software. Manovich (2013) argues that software should be a new object of study in schools and "all disciplines which deal with contemporary society and culture (…) need to account for the role of software and its effects in whatever subjects they investigate" (p.15). He presents several references supporting that there is an increasing number of people learning how to program and that as a founder of a programming academy claimed in a New York Times article, people have "a genuine desire to understand the world we now live in. They don't just want to use the Web; they want to understand how it works" (ibid., p.17). Rushkoff (2011) boldly states "*program or be programmed*" as a generalized warning for everyone but especially younger students. In his book he makes clear just what

importance programming should have in a digital world:

> *"Digital technology is programmed. This makes it biased toward those with the capacity to write the code. In a digital age, we must learn how to make the software, or risk becoming the software. It is not too difficult or too late to learn the code behind the things we use — or at least to understand that there is code behind their interfaces. Otherwise, we are at the mercy of those who do the programming, the people paying them, or even the technology itself." (p. 128)*

Manovich, although a supporter of teaching students how to program, does not claim the need for everybody to program. He understands that programming languages are still too complex but he is a lot more optimistic and believes that there is no logical reason why programming will not become an easy activity, illustrating with other older technologies that are now highly accessible.

To define media literacy today many authors focus in the new emerging consuming and producing media habits. Indeed it is considered highly important for developing up-to-date social skills, that students should be able to appropriate existing digital formats to read and write using the "new" digital environments, as the *communities of practice* defined by Etienne Wenger (2002) or the *affinity spaces*, defined by Jenkins and co-authors (2009) where people can learn by doing and participating with the support of a community where other members have varied levels of expertise in a specific area of common interest. Nevertheless, considering as Darnton (2009) claims that we are still exploring the potential of digital formats impact in our informational society, an "education for the media" should be explored instead of an "education with the media". Education for the media should mean preparing students to use and understand digital media as an evolving media where they can participate creatively, critically and responsibly. Students should understand the basis of the media they are using, e.g. internet and video games. "New" digital formats and the "new" digital languages are much more based in processes than the previous traditional media, which were based in sequential integration of information (e.g. books and movies).

2.4.2. The importance of teaching digital media literacy

Learning to learn may be the most widely accepted capacity people should develop for their professional, personal and social life. Most authors and policy makers in the field

agree with this idea (Correia & Tomé, 2000). There is an increasing idea that, in a participatory culture, digital learning is participatory learning. Some authors support this idea in the environments and applications offered by *Web 2.0*. What some authors now call "*learning 2.0*" (Downes, 2005; Shank, 2008), states that the student should be able to search and research information, to find and validate useful resources and to develop his or her own personal learning network (PLN) through participation in learning communities. In such networks, developing resources and sharing them is part of the learning process. This leads to the view Shank (2008) presents, that "people are not only assuming the role of learner, they're increasingly assuming the role of instructor as well" (p.244). This vision of the participative network as the solution for the education crisis is nevertheless contested by some authors that recommend caution (Musso, 2013). Migrating from more traditional learning settings to computers and the internet should be considered with caution as several reports and research support the idea that, without guidance, most students, if not all, may lack the ability to use the internet properly (Ryberg et al., 2011; Davidson & Goldberg, 2010; OECD, 2011, 2013a). Students in schools today, even belonging to a generation used to use computers and the internet, may not have the basic technical skills, most of them have not developed critical thinking skills and are not aware of the ethical issues required for a full participation in these learning contexts (Jenkins et al., 2009). Jenkins, in an afterword to the book "DIY" by Knobel & Lankshear (2010), makes clear the distinction between participatory culture environments and the *Web 2.0* and the dangers of the growing tendencies to describe the application of participatory culture principles to the classroom as "education 2.0":

> *"Web 2.0 is not a theory of pedagogy; it is a business model. Unlike projects like using Wikipedia that emerged from nonprofit organizations, the Open Courseware movement from educational institutions, and the Free Software movement from voluntary an unpaid affiliation, the web 2.0 companies follow a commercial imperative, however much they may also wish to facilitate the needs and interests of their consumer base." (p.239).*

In the last two decades many countries implemented programs to oppose the digital divide focusing mainly in the aspect of technological access. Some of the policies resulted in the installation of computers and high speed connection in schools and, as already mentioned, in Portugal involving the support of families in order to have their own laptops and a home internet connection. Reports and studies in the USA and the UK revealed that

the generalized access to technology had positive results (OECD, 2013b). Wartella et al. (2000) reached the same conclusion:

> *"Evidence suggests that children who own or have access to home computers demonstrate more positive attitudes toward computers, show more enthusiasm, and report more self-confidence and ease when using computers than those who do not have a computer in the home." (p.11)*

Although significant, this effort alone seems to only partially achieve the desired objectives. As Livingstone & Bober (2004) conclude, "access" is a moving target as technology and devices are in constant evolution:

> *"No longer are children and young people only or even mainly divided by those with and without access, though "access" is a moving target in terms of its speed, location, quality and support, and inequalities in access persist. Children and young people are divided into those for whom the internet is an increasingly rich, diverse, engaging and stimulating resource of growing importance in their lives, and those for whom it remains a narrow, unengaging if occasionally useful resource of rather less significance."(p.5)*

Wartella et al. (2000) reached the same conclusion:

> *"It is clear that the mere availability of computer hardware and software is not sufficient for effective integration of the varied applications and benefits technology can provide. Without the necessary knowledge and skills, the full potential will not be realized." (p. 26)*

Being able to access and engage in active participation, as we have seen in the previous topic, is not enough. The complexity of the factors involved in the generation, processing and distribution of digital media has escalated to a level that requires one further level of awareness to deal with what Jenkins et al. (2009) call the "transparency problem".

In the nineties, authors such as Turkle were optimistic regarding the ability for children to learn and prepare themselves for reality while playing with games that somehow simulate real life. Other authors as Squire (2004) and Seiter (2005) argue the exact opposite view. Many games are highly complex and while some players are able to understand how the game engine works, others don't even recognize the existence of a game engine. Most games are in fact developed to engage people in a "suspension of disbelief" in order to provide a more immersive play experience. Nevertheless, for people to "read" a game, it is

useful that at a certain point, they are aware of how the game is constructed and what are the aesthetic norms, genre conventions, ideological biases, and codes of representation in use (Jenkins et al., 2009). Kurt Squire (2004), in his PhD thesis, shows the potential of one strategy game called "Civilization III" in several areas of knowledge but also reported the need of some guided activities to achieve the desired results. The same thing seems to happen regarding the use of the internet. Most people develop some tendency to read "professional" sites as more credible than "amateur" produced materials (Gardner, 2011). This while still one of the best strategy to rely on content, is surely not enough, as the ways in which content is written and designed do not determine its accuracy or intentions. Ellen Seiter (2005) studied children playing an online game called "Neopets" that in advanced levels had product placement[50] where players could buy these products for their characters with game points. The study revealed that children often had trouble identifying these advertising practices.

Social skills in a digital world should also include ethical concerns. Gardner is clear, stating that people are not born with the set of ethical norms required to publish online. To begin with, no recognized or established norms to publish online exist. Many sites have fuzzy and ill-defined norms. Jenkins et al. (2009) asks:

> *"How should teens decide what they should or should not post about themselves or their friends on Live Journal or My Space?" (p.17)*

Professional journalists have their ethical norms defined and the needed skills to respect them and a learning process is required.

> *"Journalists are made, not born or instantly created. In an ideal past, they began as apprentice, these cub reporters were sent out, along with established reporters, to cover local stories. They observed how the veterans asked questions, took notes, checked sources, wrote drafts, interacted with editors, conducted follow-ups, posted correction. No one launched a carrier by covering the White House for the New York Times." (Gardner, 2011, p.27)*

When publishing online, teenagers have little to no guidance, or supervision, from adults and most of the times miss to understand the implications of what they published until it

[50] Product placement is considered a marketing strategy described by the European Union as "any form of audiovisual commercial communication consisting of the inclusion of or reference to a product, a service or the trade mark thereof so that it is featured within a programme" (http://ec.europa.eu/avpolicy/reg/tvwf/advertising/product/index_en.htm)

is too late. Recently, in Portugal, a bullying scene was captured on camera and published online, the violence of the images naturally shocked the country. To summarize, students entering universities may fall behind in what concerns access, ability or will to use IT autonomously and may not have the needed skills to actively and responsibly participate in a highly mediated culture.

2.4.3. Core digital media skills and attitudes

As we have seen before, there are many different skills and approaches people now have for engaging in social and cultural activities in order to be autonomous learners and critical participants in a digital mediated world. Discussing a set of the most relevant digital media skills and approaches allows teachers, students and researchers to better define their goals in what concerns expanding the benefits of teaching and learning today with ICT. We will now focus on what may be considered the most advanced skills that should be developed and practiced in digital learning or for digital learning. As already discussed, these skills, mainly seen as social skills, are built on reading and writing skills, research skills and critical analysis skills. The white paper from Jenkins, et al. (2009), proposes a set of eleven core media skills: ***Play; Performance; Simulation; Appropriation; Multitasking; Distributed Cognition; Collective Intelligence; Judgment; Transmedia Navigation; Networking; Negotiation.*** These skills will be categorized into two separate lists, distinguishing between skills that are more oriented toward application usage and those more concerned with social networking development.

Application usage skills

Play is described as "the capacity to experiment with one's surroundings as a form of problem-solving" (Jenkins et al., 2009, p.4). It is the approach needed to engage in the exploration of a new application. With the available information and options, the player poses certain hypothesis about how to solve a problem and then tests the result executing them. Trial and error allows the players to refine their hypothesis. Jenkins et al. (2009) valorize this skill as central in starting projects or designing solutions from scratch with any type of problem. Students can develop this skill not just by playing games but also whenever an activity is set using teaching and learning game principles. In education several applications are in use with

user friendly interfaces to develop games even without knowing any programming language[51].

With some resemblance to play, ***simulation*** refers to "the ability to interpret and construct dynamic models of real-world processes" (ibid., p.4). This is the skill that allows people to manipulate, interpret, and create situations that mimic the real world.

Distributed Cognition is considered "the ability to interact meaningfully with tools that expand mental capacities" (ibid., p.4). This skill in the digital context relates to the ability to choose the right source to find information online or of knowing which application to use for structuring a project or any other objective.

Appropriation is "the ability to meaningfully sample and remix media content" (ibid., p.4). It is an essential skill for whenever one finds material online that wants to use it for his own purposes mixing and remixing from several sources. It is the ability to value others' work and to know when it is appropriate to use them and under which conditions. When developing content it is the capability for responsibly use and integrate other's content in one's own project in a meaningfully way.

Social networking skills

Networking as a basic skill for participation is "the ability to search for, synthesize, and disseminate information" (Jenkins at al., p.4). It is the skill used to browse for information distributed in social networking sites and the ability to share content in relevant ways.

Judgment is "the ability to evaluate the reliability and credibility of different information sources" (ibid., p.4). It is also described as the ability students must develop in order to know which sources to use for specific purposes, and to be able to identify what may be appropriated or not in specific contexts.

Collective Intelligence is "the ability to pool knowledge and compare notes with others toward a common goal" (ibid., p.4). Based in the idea that no one knows everything, this is the skill needed for team work and collaboration in order to access information and solve problems together.

[51]The most famous open source application for game development is Scratch (http://scratch.mit.edu/), but others can be found online (http://gamestarmechanic.com/).

Negotiation is “the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms." (ibid., p.4). Online communities are environments of convergence of multiple cultures and multiple rules for participation. Negotiation is the aptitude to respect others ideas and being able to understand others points of view in order to accept them.

Multitasking is “the ability to scan one’s environment and shift focus as needed to salient details” (Ibid., p.4). Often criticized, multitasking is an important skill that enables students to manage their attention and being able to cope with more than one task at the same time without undermining the overall objective.

Performance is “the ability to adopt alternative identities for the purpose of improvisation and discovery” (Ibid., p.4). Like in role play games, assuming another identity allows one to change not only the perspective one has of the world, but also the decision making process in specific situations. The ability to perform can be a value throughout life as there is clear benefit from assuming different parts in order to understand realities different than one’s own. This skill is important to develop flexibility of mind. For example, when online, or on the phone, people rapidly need to shift between different sets (e.g. home, school, work) where they may need to assume different roles (e.g. learner, tutor, chief).

Transmedia Navigation is “the ability to follow the flow of stories and information across multiple modalities” (Ibid., p.4). As we have seen with the internet, computer information can be accessible in multiple different formats. To profoundly research any subject it may be essential to follow the available information in whatever format it is available. In some cases it can be in written text and video, or in images or sound, it can even not be available online and require one to find the materials in their original, or reproductions, in analogical or physical format and make sense of all the available materials. All these skills can be related to new digital format or environments. Exploring the digital world entails ways in which these skills can be further extended, further explored or further supported. Nevertheless all of them remain social skills and can surely be developed out of digital environment and, as a consequence, can be of value in non-digital situations.

> *“We suspect that young people who spend more time playing within these new media environments will feel greater comfort interacting with one another via*

> *electronic channels, will have greater fluidity in navigating information landscapes, will be better able to multitask and make rapid decisions about the quality of information they are receiving, and will be able to collaborate better with people from diverse cultural backgrounds. These claims are borne out by research conducted by Beck and Wade (2004) into the ways that early game play experiences affect subsequent work habits and professional activities. Beck and Wade conclude that gamers were more open to taking risks and engaging in competition but also more open to collaborating with others and more willing to revise earlier assumptions." (Jenkins et al., p.11)*

Jenkins and his co-authors do not propose that one activity should support the development of all of these skills. In fact, in this white paper, these skills are individualized and successful examples are provided to show the relevance of exploring single skills in specific subjects and disciplines. There is a clear support that these different skills, rather than being integrated in one single course, should be distributed throughout the curriculum and across as many disciplines as possible.

2.5. Concluding remarks

Contributions and ideas selected for this chapter provide a framework for the definition of a learning model and already some orientations toward the definition of a methodological approach for action that will be discussed in the next chapter.

Theories and authors were presented as part of an evolving field of research that has been highly explored by multiple perspectives and that seems to be still defining itself. We started with emphasizing the didactic importance of audiovisuals and multimedia formats that are increasingly used in education and then explored how multimedia and interactivity bring new challenges to professors, programmers, designers, and students. The contribution of constructivist theories applied to education combined with the notion of how difficult and hardworking is the process of developing effective and efficient multimedia for educational purposes leads to consider learning activities where students may be participants in the construction of their own didactic materials within guided processes. We have then addressed several constructivist approaches that explored the influence of social context and environment

in the learning processes. Departing from several models that propose students involvement in cooperative and collaborative endeavors to solve problems we presented *connectivism* as an emerging learning theory with the ambition to include the role of several self-learning skills and attitudes associated with social networking. *Connectionism* seems well adapted to online learning providing an unconventional perspective to the value of some technologies that may also be used in face-to-face learning.

We provided an overview on the discussion concerning the educational value of using technology in schools and universities having as an objective the definition of the class as a place where the use of computers and the internet should be balanced according to professors' and students' skills and ambitions, and with the potential they offer toward defined learning goals.

Finally we ended this chapter with perhaps the most important discussion in education that is the definition of a digital literacy that may have into account the importance of raising awareness of students for the complexity of the mediated world we leave in, and at the same time that provides the need tools for participatory engagement.

These discussions propose a framework for action that allows the definition of a learning model that aims at supporting professors and their students to master the necessary skills and approaches for the development of responsible participatory online learning. The explored debate leads to conclude that most important notions for efficient self-learning today, as online exploratory activities, are not intuitive for most students. For example, most students don't develop notions concerning where to search and how to search for information, nor how to check for content accuracy by themselves. Also several students have misconceptions of the limits of the online available data and can lose hours searching for something that simply is not there. A learning model that explores a rich learning environment as the internet should have into account a set of presented skills in order to prepare students for having an active citizenship in a world that can benefit from a much participatory culture.

Chapter III

3. Design and research methodology

The domain of educational use of technology, in which this study includes itself, is highly interdisciplinary. As Daniel Peraya and Bernardette Chalier (2007) frame it, it is a domain of interception of learning sciences, learning psychology, audiovisual pedagogies, media education, instructional technologies and school informatics. Therefore, research in this domain of study should take into account the interface of several tensions between those dissimilar research fields, their epistemological stances and consequently different research methodologies.

This chapter provides a framework to contextualize the options made in the development of this research project focusing particularly on the definition of an empirical study. The first section introduces some aspects concerning the actual discussion about research methods in this field, focusing in epistemological and methodological concerns found in the specialized literature. The second section presents the main settings for the empirical work. It starts with the definition of the study objectives and how they interact with the research questions. Then it presents the instructional design model to be proposed and the most relevant aspects of the adopted authoring application. The last topic describes the work developed before implementing the instructional model and the design of the research tools and procedures.

3.1. Research methods in digital media education

Several authors assume learning sciences and, in particular, educational technology as a field still struggling to deal with the multiple theoretical perspectives and research paradigms (Scott & Usher, 2011; Peraya & Charlier, 2007; Reigeluth, 1999; Reeves, 2006, Coutinho, 2005). Thomas Reeves (2006) listed a number of authors (e.g. Larry Cuban,

Todd Oppenheimer, David F. Noble) that, in recent years, have raised their skepticism about this field of research. Highlighting Lagemann's (2000) ideas, he pointed that "in a misguided effort to be recognized as being truly 'scientific', educational researchers have turned away from the pragmatic vision of John Dewey" (Reeves, 2006, p.88). Some, he claims, seem more concerned with establishing the legitimacy of one educational research tradition over another rather than improving education per se (e.g. Kieran Egan).

Many research methodologies in social sciences have been discussed since Anthony Giddens (1976/1993) and Jürgen Habermas (1973/1982) first contested the positivist and interpretative paradigms in social sciences. These paradigms fall short in their views, because they are concerned with understanding phenomena and situations through meanings and interpretation in an already interpreted world. Critical educational research is considered to be highly influenced by Habermas when he discusses critical theory as an explicitly prescriptive and normative intention. Research purpose should not be merely trying to understand situations and phenomena but rather change them (Cohen et al., 2007). He suggests that sociology must understand social facts in their cultural significance and as socially determined. Within this paradigm, the research within social context should not merely analyze what is happening now but consider its own influence, which should be concerned with emancipatory action.

> *"What we have in effect, then, in Habermas's early work is an attempt to conceptualize three research styles: the scientific, positivist style; the interpretive style; and the emancipatory, ideology critical style. Not only does critical theory have its own research agenda, but also it has its own research methodologies, in particular ideology critique and action research." (Cohen et al., 2007, p.28)*

Habermas' conviction is that any research style has an ideological stance and his contribution is to define a style where participants can assume reflexive and emancipatory stances. This was perhaps the main contribution that led many researchers in the field of education to consider empowering professors as active participants over their own praxis and to take action toward innovation.

3.1.1. Action research and epistemic concerns

Many authors believe that the positivist research methods in education are simply

not adjusted. David Scott and Robin Usher (2011) sustain that the experimental method is deficient for five reasons. They present concerns regarding the experimentalist's capacity to grasp subtleness in effects of any intervention. They believe inappropriate to consider a casualty mechanism based in succession not taking into account generative theory of causation. In their view, experimentalists attribute a rather minor importance to background and context in the research process, which combined with the used artificial settings, cannot allow any certainty concerning the behavior of any other human being outside of these settings. Also, they discuss the ethical concerns, regarding the method to be discriminatory for participants. Jean-Louis Le Moigne (1994) claims that the application of the positivist experimental method in social sciences has too many inconveniences and therefore should be questioned. He claims that before beginning "experimenting" one should "model" and reflect instead of applying research models or simply analyzing situations that may cause injury to subjects. The constructivist method is set on the demolition of three major postulates traditionally associated to the scientific positivist legitimacy:

- **About *replicability*** – it is not possible to conceive social relations without evolution and therefore " nothing in society is ever «equal somewhere»" (Le Moigne, 1994, p.244)
- **About the *ends*** – behaviorist studies since the 80's converge in the idea that "there are stimuli without answer and answers without stimuli" (ibid, p.245).
- **About *complexity*** - social phenomena imply a non-divisible complexity and consequently some opposing results may need to be tolerated and accepted.

Le Moigne (2007) proposes an active construction of knowledge that drives from a project focused in the question "how to…?" to the "why…?". As Habermas, he claims that contemporary epistemology requires the researcher to have a critical perspective over his own research, taking into consideration that whichever it may be, it will not be neutral but projective. In other words, he claims that there should be reasoning in terms of researching "in order to" instead of in terms of "because". He claims that the way a research project is modeled or conceived should drive from the final objective or search for a final objective. However, to assume this active stance, Le Moigne claims for strategic thinking and carefully intentional designed research projects.

Research in education technology, in the perspective of many researchers, should be considered within its own specificity:

> *"Educational technology researchers would do well to heed Sir John Daniel (2002) who wrote: '…the futile tradition of comparing test performances of students using new learning technologies with those who study in more conventional ways…is a pointless endeavor because any teaching and learning system, old or new, is a complex reality. Comparing the impact of changes to small parts of the system is unlikely to reveal much effect and indeed, 'no significant difference' is the usual result of such research.'" (van den Akker et al. 2006, p.94)*

Action research generally does not assume control groups and it has been extensively used in education in several areas like improvement of teaching methods, learning strategies, evaluation procedures, attitudes and values change. Research can be done by one single professor or a group of professors working cooperatively or even with professors alongside with researchers. There is then no definition of a single set of research procedures but rather general principles. There are many approaches to define action research. Following Habermas's critical theory, Wilfred Carr and Stephen Kemmis (1986) present it as the research that supports professors to undertake their own agendas in order to improve their understanding of their practices in the path to maximize social justice. There are those researchers who see action research more as *planning action*, *observing* and *reflecting* in a more carefully, systematic, and rigorous way than one usually does in real life.

As a methodology that should deal with the allegation of a biased researcher that is highly involved in the research process, many authors have extensively listed defining principles and procedures to sustain their practice. Many learning practitioners and researcher find themselves developing implementation environments, defining specific frameworks of action, their own tools and pedagogical models consistent with their assumptions and ideologies. With research objectives in mind, scientists do not assume exclusively an observing stance but rather engage themselves in systematically engineering these contexts in order to improve and generate evidence-based claims about learning. Critics believe that as the researcher engages in this effort to achieve their goals their research becomes more biased or more limited to a specific local context. Critics claim that

principles resulting from this research are often so context-specific that they lack applicability in any other context and are of limited use for other researchers or practitioners.

Most critics also present several concerns regarding action research results as, for instance, the well described *Bartlett Effect*. This effect is described as the tendency of the researcher or theorist, when analyzing research data, to select those segments of data that are more favorable to his own idea (Brown, 1992). Alava (2007) presents this problem and makes some suggestions in what concerns the level of involvement of the researcher in the innovative process. She claims that the researcher needs to clearly separate the time to implement innovation and the time to research. For instance, she recommends an intervention where the researcher may be independent from the institutions involved, or if an application is being developed, some distance to the developing team should exist. However, she believes that whenever this proximity exists it may be possible for the researcher to consciously create some distance to avoid the biased effects that can mislead the researcher when theorizing (Alava, 2007). As Alava, several supporters of action research developed the idea of creating cycles to support the research process in time allowing the needed time to observe, reflect and plan before taking action (e.g. Zuber-Skerritt). Summarizing, action research can have several benefits over a simple positivist or merely interpretative research project, but many concerns should be thought out before engaging in empirical work. Building on the work of some action research supporters collected by Louis Cohen et al. (2007) and by Terry Anderson and Julie Shattuck (2012), some practical problems regarding this methodology are pointed out:

- ***Feasibility*** – practitioners may not have the time and capacity to develop the resources for data gathering and for data processing needed alongside the normal workload;
- ***Scalability*** – developed theory may be too specific and adjusted to small-scale investigation but rather too minimal to be valid for other applications;
- ***Reproducibility*** – research results may not be possible achieve by anyone who wishes to practice them as they may build on the competencies or tools only possessed by practitioners;
- ***Effectiveness*** – methods contribution for a genuine improvement of

understanding and skill development beyond prior practitioners competence may not justify the time and energy expended;

- ***Impact*** – results require a audience that should be available for the results not only the researcher as his own audience but his institutional or institutional external colleagues.

Many researchers claim that innovation in education with technologies is not too difficult at a local level. Brigitte Denis claims that what is difficult is to make "good practices" have a real impact in education. To become *systemic*, the research approach should focus problems in a systemic but also in a contextualized way. For this she claims it is necessary to follow and analyze innovative projects that improve themselves, appropriate practices, transfer and integrate an additional value to the instructional system (Denis, 2007).

3.1.2. Design-based research and practice

Within the existing crises of educational technology research validity, reported by Thomas Reeves (2004), Bernard et al. (2004) and John Daniel (2002) among others, there is an increasing hope associated to a different philosophical framework increasingly used by many researchers and practitioners. In this work, following Reeves (2004) and others (Anderson & Shattuck, 2012; Herrington et al., 2007), we label this framework as design-based research (DBR) although many other labels are used in the literature, such as "developmental research" (McKenney & van den Akker, 2005) and "design experiments" (Brown, 1992; Collins, 1992). This emerging methodological approach, which can be traced back to Ann Brown (1992) and Alan Collins (1992), tries to deal with the identified limitations of action research providing a frame of action focused in the evolution of the design principles. As Sasha Barab and Kurt Squire (2004) state, "the design is conceived not just to meet local needs, but to advance a theoretical agenda, to uncover, explore, and confirm theoretical relationships" (p. 5). As Paul Cobb et al. (2003) put it, DBR requires the research to be both humble and accountable to the design, meaning that the focus should be the design and how it is defined in order to apply theory to practice. In other words, the processes of design and implementation should provide detailed guidance to how instruction is organized.

Some distinctive features between DBR and action research are concerned with the role of the practitioner or educator. While in action research the educator is both researcher and professor, in DBR the idea is to have a partnership between the professor and the investigator. It is assumed that research may be an activity too much demanding to be overlaid to the professor's already demanding regular activities. Also, it may require training and confidence and will to conduct rigorous research that many teachers don't have (Anderson & Shattuck, 2012). Analyzing the results of introducing action research training in teachers' curriculum Jethro Pettit (2010) claims:

> *"We found that gaining confidence in using action research methods requires more time and preparation than we had thought. The challenge is not just to teach research methods, but to help practitioners learn and improve their ways of working through the medium of action research." (p. 823)*

Contrary to other research approaches, it is assumed that the researcher is not knowledgeable of the needed complexities of the cultural, political and technological of the educational context where the intervention is taking place. DBR is thought to be more adjusted to set a frame of action that takes into account the messiness of real-world practice regarding the context as a key relevant element, instead of a superfluous variable that can be overlooked. While involving participants in the research and not considering them as mere "subjects", DBR is open to their contributions to the design and evaluation of the interventions. DBR then implies flexible design revision, considering multiple dependent variable and social interactions assuming ill-defined problems and the complexity of real contexts. To do this and at the same time pursue traditional research objectives has proven to be controversial. Critics of this research approach claim that the simultaneous variation of many factors that are found in such conditions runs against the fundamental principle of research which is to "control variables" (Phillips, 2006).

As noted by Barab and Squire (2004), DBR stance comes from:

> *"A fundamental assumption of many learning scientists is that cognition is not a thing located within the individual thinker but is a process that is distributed across the knower, the environment in which knowing occurs, and the activity in which the learner participates. In other words, learning, cognition, knowing, and context are irreducibly co-constituted and cannot be treated as isolated entities or processes." (p.1)*

DBR approach focuses existing problems in a real context and, as in action research, researchers assume an active stance designing and implementing the solution to address them. The researcher generally assumes an active role promoting changes in the curricula and in the used pedagogical methods and processes. Generally DBR involves introducing a new technology or a learning activity and follows interventions where students assume important roles in the learning process. This approach is consistent with the most used models in instructional design and e-learning projects. One of the most used models is labelled ADDIE (Analysis, Design, Development, Implementation and Evaluation). As required in DBR, ADDIE is well suited to follow a cycle with several iterations. From an initial implementation, other iterations are developed based on conclusions deriving from the previous interaction. This fundamental characteristic of this methodology allows reinforcing particular theoretical constructs that can be relevant in different contexts of intervention (Herrington et al., 2007). Barab and Squire (2004) provide a broad definition that reinforces this central aspect:

> *"[DBR proposes] a series of approaches, with the intent of producing new theories, artifacts, and practices that account for and potentially impact learning and teaching in naturalistic settings."(p.2)*

Although it valorizes the environmental particulars of the contexts in which these constructs are generated or refined, it aims at transcending them. In this perspective, this methodology valorizes both elements that may be common from one iteration to the next but also elements which make them distinct. The researcher should have a critical ethnographical approach and should consider a procedure that may allow both *experience-near* and *experience-distant* work in order to increase both significance and relevance (Geertz, 1983).

Although numerous articles exalt the benefits of DBR, useful critiques have also been pointed by some authors (Anderson & Shattuck, 2012). As in action research, DBR also faces too much involvement of the investigator in main aspects of the study, from conceptualization to implementation, thus compromising the credibility of the assertions (Barab & Squire, 2004). This challenge is well known to anthropological research and most qualitative research methods that have always dealt with the researcher's bias in the research process. Many researchers claim that the deeper the involvement is, the better can be the researcher's

understanding of the context allowing himself to be the best research tool.

> *"…the researcher is the primary instrument for data collection and data analysis." (Merriam, 2002, p.5)*

Anderson and Shattuck (2012) claim that DBR research demands skepticism, commitment and detachment, however, it also requires comradeship, enthusiasm, and willingness to actively support the implementation. A good balance between objectivity and bias is needed to allow both effective interventions and impartial judgment of results. Having multiple iterative cycles in time with the involvement of different participations is considered to provide opportunities to leave the researcher some level of detachment to the particular effects and situations, allowing better analysis of results (Herrington et al., 2007). The anthropologist Clifford Geertz (1975) already introduced the discussion regarding the importance of ethnographic work having both *experience-near* significance and *experience-distant* relevance that is only possible with the involvement of the ethnographer with the research participants in their own context using their own vocabulary and concepts. However, he claimed for a balance between the involvement in the field and the theoretical *experience-distance* reflection and interpretation.

> *"Confinement to experience-near concepts leaves the ethnographer awash in immediacies, as well as entangled in vernacular. Confinement to experience-distant ones leaves him stranded in abstractions and smothered in jargon." (p. 48)*

Summarizing from several authors (Design-based Research Collective, 2003; Reeves et al., 2005; van den Akker et al., 2006), DBR must be:

- ***Interventionist*** – aims at designing significant intervention in the real world;
- ***Iterative*** – requires an approach that implies cycles of implementation and design refinement;
- ***Process-oriented*** – focuses on understanding and improving interventions;
- ***Utility-oriented*** – focuses on applicability for people in real contexts;
- ***Theory-oriented*** – is based upon theoretical propositions and aims to contribute to theory building.

Reeves (2006) also presents as a distinctive characteristic of DBR from Predictive Research approaches, the idea of constant refinement of the problem, solutions, methods and design principles along the elaborated phases in Figure 1. This model does not follow precisely ADDIE phases in sequence. Although the whole five phases are included (Analysis, Design, Development, implementation, Evaluation), evaluation and design are merged together in order to produce changes in each of the remaining phases.

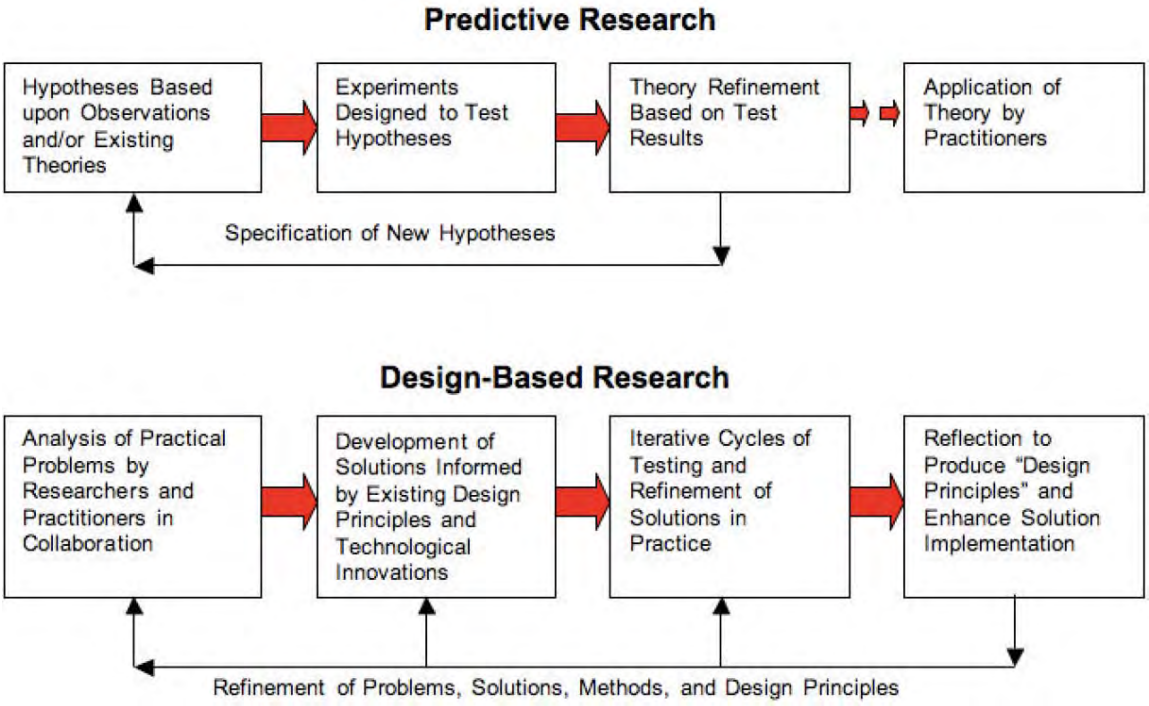


Figure 1 - Predictive and DBR approaches in educational technology research (Reeves, 2006, p.96)

Authors as Reeves (2006) sustain the importance of prolonged research projects of several years and believe that the method presents cumulative benefits from having many iterations. Nevertheless, along with others (Herrington, et al., 2007), he supports the idea of having PhD research projects following this research approach, presenting its feasibility within a four years time lap.

Instructional design theory is an emerging paradigm in the field of research in education. Charles M. Reigeluth (1999) presents instructional design theory as being design-oriented and the main characteristics presented match DBR orientations. He calls design-oriented theories as prescriptive in nature, “in the sense that they offer guidelines as

to what method(s) to use to best attain a given goal" (p.7). Contrary to most familiar kind of methods that focus mainly on the results of given events, these design oriented theories focus on the means. Following this orientation, instructional design theories have in common (Reigeluth, 1999):

- Being goal oriented in the sense of providing directly useful guidance to educators;
- Identifying methods of instruction and situations in which those methods should be and not be used;
- Methods of instruction are described in their detailed components (e.g. processes, features, criteria, values);
- Methods are probabilistic rather than deterministic, meaning that they indicate an increase of chances to achieve goals rather than to guarantee goal achievement.

However, instructional design theories have been evolving in order to follow systemic changes that are occurring not only in education but in society. DBR is well fit to provide support to what are considered systemic changes that focus on the evolution of consistent learning methods and their testing in diverse scenarios. It does not try to follow a trend but rather to have a critical stance developing learning models and processes that focus on having professor and students involved in the design and development of their own instructional and learning processes.

3.1.3. Systemic research approach and technology

Systemic research approaches in education have been discussed since the late 60's, as researchers began to work in real scenarios and the importance of contextualizing their work was recognized (Viens, 2007). It is since then that research using ICT gained progressive relevance. DBR assumes a systemic approach as it takes into account all the different actors of each situation in which it intervenes, but has the commitment of being aware and reflecting at a global scale taking into consideration cultural, sociological, economical and political agendas as well as the academic work and experience developed outside the implementation contexts.

A critical and reflective stance is fundamental when considering research in this field that, as we have seen in the previous chapter, gathers the attention of many powerful entities with specific agenda interests. DBR requires this overview in any research project, which should consider the many layers that influence the work developed in each class.

> *"Education is multilayered, constantly shifting, and occurs within an interaction among institutions (e.g., schools and universities), communities, and families.(...) Because the U.S. education system is so heterogeneous and the nature of teaching and learning so complex, attention to context is especially critical for understanding the extent to which theories and findings may generalize to other times, places, and populations." (National Research Council, 2002, p.5)*

Several authors claim that this field of research is not only changing, as we have seen, in what concerns the researching methods used, but also in the perspective in which technologies are assumed in learning situations and at the level of the objects of research (Peraya & Charlier, 2007).

In the pursuit of systemic impact of educational research, Denis (2007) proposes that, without falling in idealized views of technology, innovation can result of the use of new technological tools and environments if they become true cognitive instruments for their users. She supports that technology should not be imposed to students or professors but rather be assimilated by them as they interact with it and realise that it facilitates specific processes in the new pedagogical model. She claims that applications should, first of all, reply to a specific need.

Institutions, professors, students, parents and society in general have distinct views about the use of ICT in class. When proposing innovation in class, diverse perspectives should be considered in order to successfully manage the implementation at an adjusted pace. Only with flexibility should it be possible to have positive effects and at the same time be able to evaluate real impact and outcomes. Implementing small changes may benefit not only their results, but also the study of their efficiency (Denis, 2007). As Brown (1992) indicates, developing research in real educational contexts should have a systemic approach:

> *"as it is impossible to change one aspect of the system without creating perturbations in others, so too it is difficult to study anyone aspect independently from the whole operating system."(p. 143).*

Technology perspectives change

The perspectives about technology and media uses in education are changing at least since the 70's. Jacques Viens (2007) argues about the important distinction between using the term educative technologies and educational technology. Two important differences are noted. Firstly, the adjective educative suggests that technology alone educates. Many researchers claim that this is a wrong perspective, as the student only learns within a learning activity and a specific context. Much inconclusive research developed in the last 30 years is associated with this fundamental flaw, which is focusing on the technology design instead of working in real scenarios and considering the different dimensions. Secondly, using the plural (technologies) suggests a study focused in particular technological tools rather than techniques. Detaching from objects and particular tools allows addressing the research in a more "scientific" way. As noted by Jackson and Anagnostopoulou (2001), having both approaches allows not only the understanding of details of a certain material representation of a technique but also an overview of the technologic process as a whole.

> *"Where effectiveness is demonstrated, it can often be attributed to a pedagogical improvement rather than to the use of the technology itself. (…) arguments claiming that pedagogical improvements inherently follow from the use of online technologies are dangerously misleading" (ibid, pp.61,63)*

Viens (2007) also sustains the importance of dynamic collaboration between the different actors in the terrain e.g. professor, students, designers or programmers that should learn with each other defining in the learning environment objectives, activities, resources and evaluation processes. Once again this is consistent with DBR, not only about the amount of media and technology that is brought to the classroom, but also the way in which it should be considered. Traditional research in the use of technologies in education focus on the effects on students, DBR proposes to focus what should change in the technologies or in the way they are used to benefit the educational process.

Several authors claim that ergonomic studies should be developed whenever a new application or new technology based education strategy is introduced (Tricot et al., 2003; Dillon & Morris, 1996). Bétrancourt (2007) claims that researchers tend to focus their quest in the replying the question "Do ICT in education allow to learn better, quickly and with

more pleasure?"[52] (p.78). Answering this particular question requires focusing on the specific contexts of use and on particular applications. As we have seen in the previous chapter, some technological tools are better adjusted to some purposes than others. Many authors propose the same questions to address the combination between focusing on particular tools and having a distant overview. They mainly suggest combining ergonomic studies with social sciences methodologies. Andrew Dillon and Michael Morris (1996) proposed three dimensions of study when introducing a "new" technology or a new model:

- ***Utility*** – does the new technology introduce a benefit (time, cognitive effort or interest) to achieve a specific goal in comparison to previous used solutions?
- ***Usability*** – is the new technology simple and easy to use, allowing users to achieve desired objectives with efficiency and satisfaction?
- ***Acceptability*** – what changes does the new technology induce in users in what concerns behavior and social role in real contexts?

These three main questions drive the research toward both specific and broad issues concerning individuals' practices. As Bétrancourt (2007) puts it:

> *"It is indisputable that ICT for education should not only be easy to use and adapted to the context of use, it must primarily promote learning activities, whether at the level of interactions, the acquisition of knowledge or yet the experience of learners."*[53] *(p.79)*

In other words, if technology does not fulfill a learning need or provide a better experience than previous technologies, it should not be used. It is not to say that technologies which are difficult to learn should not be used but rather to say that if there are other technologies accessible, they should be preferred. Of course this excludes the case when the technology itself is the learning objective and tasks are considered part of a major learning process.

Technology in education should be seen as in any other context. As Norman puts it, "[a] major role of new technology should be to make task simpler." (p. 191). Tasks are important and should be considered critically in the learning process, but so is experience. This is probably the main distinction between previous social-technical ergonomic

[52] Translated from French by the author.
[53] Translated from French by the author.

approaches and the human-centered design approach supported by many authors like Gomoll (1990/2001), Nicol (1990/2001), Dilon & Morris (1996) and Nielsen & Loranger (2006). It is becoming widely accepted that interfaces are malleable and should be adapted to best fit their users' needs regarding effectiveness, efficiency, satisfaction and pleasure within real situations. Consequently, users should be included in the design and development process cycle at early stages of development. In what concerns applications use or internet use, for instance, the experience of the user is recognized to be very significant in terms of performance and satisfaction (Nielsen & Loranger, 2006).

Participants' perspectives and technology

Considering participants' experience is now widely accepted in the design world. User satisfaction is now regarded as one of the most important factors for evaluating the design of materials, sets and activities. Because of this "researchers strive to understand the meaning people have constructed about their world and their experiences" (Merriam, 2002, p.4) when immersed in a learning activity. Systemic research approaches should consider not only what can be done in the scope of the research study but the applicability of research outcomes in other multiple scenarios.

> *"[A]n effective intervention should be able to migrate from our experimental classroom to average classrooms operated by and for average students and teachers, supported by realistic technological and personal support" (Brown, 1992, p. 143)*

Taking both professors and students into account is fundamental to the success of any intervention. If they liked it and are satisfied they are most likely to use it again and recommend it. Students' contributions should be taken into careful consideration specially when engaging in interface usage. Professors participating in the research study should contribute actively in the instructional design process and when possible in the evaluation of the research project.

> *"The partnership in a design-based study recognizes that teachers are usually too busy and often ill trained to conduct rigorous research. Likewise, the researcher often is not knowledgeable of the complexities of the culture, technology, objectives, and politics of an operating educational system to effectively create and measure the impact of an intervention." (Anderson & Shattuck, 2012, p.17)*

Part of the concerns when involving participants in auto evaluation processes is the famous *Hawthorne Effect*, which has been pointed out by many critics of action research.

> *"[Hawthorne Effect] refers to the fact that any intervention tends to have positive effects merely because of the attention of the experimental team to the subjects' welfare.(…) The standard interpretation of these findings is that the mere presence of a research team will lead to enhanced performance because of the motivational effect of the attention received by the 'subjects'." (Brown, 1992, p.163)*

This effect is recognized in different types of research as, for example, in usability testing as pointed out by Nielsen & Loranger, (2006):

> *"In general, subjective satisfaction ratings are not very telling usability measure because users tend to give generous scores even when they have great difficulty using a design. One reason for this is the general human desire to be polite and fit in." (p.26)*

Several techniques can be used to deal with this matter. Brown (1992) for instance deliberately designed her interventions to be multiply confounded.

Many uses of technologies propose learning by doing models and discovery learning as already presented in the previous chapter. Brown (1992) suggests some orientations to facilitate discovery learning in classrooms:

> *"Guided learning is easier to talk about than do. It takes clinical judgment to know when to intervene. Successful teachers must engage continually in on-line diagnosis of student understanding. They must be sensitive to overlapping current zones of proximal development (…) Guided discovery places a great deal of responsibility in the hands of teachers, who must model, foster, and guide the 'discovery' process into forms of disciplined inquiry that would not be reached without expert guidance." (p.169)*

Defining design principles to support professors' activity autonomously should try to reduce professors' stress in as much processes as possible. Within technological innovative projects, it is necessary to balance the amount of support the investigator should provide both to professor and students as to understand the level of autonomy the model offers to professors.

3.1.4. Qualitative and quantitative research methods

Considering research in education to be a social practice where the researcher is embedded and embodied within a specific context, Scott and Usher (2011) make clear that there are no "right" universal methods to be applied invariantly. Before entering in some details of the research protocol here we introduce some methods that were considered for this study. It is however important to note that researching in education should not mean to simply follow a specific method or set of procedures but rather adjust it and critically adapt it to each situation.

Qualitative and quantitative research methods are most times assumed as opposed, since they diverge in assumptions about the nature of knowledge, even thought authors such as Scott and Usher (2011) see a rather a growing tendency in social sciences to consider both to be compatible.

DBR assumes most of the times a qualitative research approach, but there is no exclusivity or a selection of research methods. Many DBR studies assume also quantitative methods to further sustain or complement qualitative ones. Qualitative studies generally benefit from a richer triangulation of methods. In ethnographical interventions, qualitative methods are done with direct or interactive techniques, which include observation and interviews, and indirect or non-interactive methods that involve the analysis of registers such as e-mails or diaries.

Qualitative direct methods

Systematic observation

Collecting data in the classroom is done directly by the investigator that observes actions as they take place. Within a direct observation, there can be followed distinct attitudes regarding the level of interaction as the researcher can be highly participative, moderately-participative or rather non-participative as he may intervene more or less with the subject being observed.

Generally it is assumed that the most participatory interventions lead to more subjective interpretations from the investigator. In the other hand interventions in which the researcher interacts as little as possible with participants is commonly considered more

objective. As already mentioned this is questionable and Scott and Usher (2011) reframe it as dependent on the epistemological assumptions underlying the use of the researcher as a research instrument.

Observational survey reports are often taken as factual and objective whenever the subject being studied is well defined and there is no room for ambiguity. However, in education, several observed phenomena like attitudes, beliefs and intentions may be considered highly subjective and leave much space to interpretation. For operational reasons, most subjective terms should be avoided or defined as part of the description of the measurement procedure. Ideally procedures should be described and made available with enough detail as to allow its reproduction.

Data collection can be done by taking notes, recording video, taking pictures, capturing screen displays, or collecting students developed materials, like drafts or notes. These elements can offer some help providing some factual evidence of what happens. Yet, even with the best recording technologies, many aspects can remain out of the frame and therefore are generally more useful to the researcher, who is able to contextualize better the collected material. Technical procedures for data collecting should be done interfering the least possible with class activities and with students' consent whenever possible.

Asking questions

Many aspects cannot be observed directly, therefore most studies require at least some elements to question participants in order to obtain verbal answers. This questioning can be done while in a participatory observation, in an interview, through questionnaires or for instance in a focus group session.

However, asking question demands some caution, as the way they are phrased will certainly influence the informants' interpretation and their answers (Sapsford, 2007). For instance, ambiguity should be minimized to leave less opportunity to misunderstandings, e.g. asking if one has a computer at home may be much different than asking if one owns a computer. The researcher should bear in mind the fact that some questions can be inconvenient and consider an indirect question more successful, e.g. asking "what is your age?" has much higher refusal rate than for instance "When were you born?". People generally try to follow socially or politically correct answers or attempt to be helpful

instead of providing true answers. Many recognized techniques exist to avoid these last effects which are often detected whenever questions focus on attitudes, opinions or intentions. Indirect questioning or having questions reframed in order to conceal what is the "right" answer is often used. Researchers may also conceal or veil the purpose of the research in order to avoid people trying to help with their answers (Sapsford, 2007). There are different formats for questioning, from the most informal approach of asking questions when practitioners are developing their activity, to much formal approaches using structured interviews. Interviews can be done individually or in groups, as for instance, in the focus group model. For each of the mentioned solutions, training is often recommended as well as having a script prepared with the questions and a description of any relevant feature that should be considered. Rehearsals are also advised, as they may allow detecting script flaws or prepared solutions for eventual problems (ibid.).

Focus groups are considered to be a recent technique in education, proposed as an activity where participants gather in circle or in "U" to openly discuss a set of topics. The investigator should present the objective of the discussion and manage it with limited intervention only to maintain the students discussing the suggested topics. This technique is considered well adjusted to understand student's common notations and allow sharing vocabulary and a semantic common ground (Aires, 2011).

Qualitative indirect methods

Register analysis

Blogs may often be used as a place where students can leave their opinions, express their interests, perspectives, likes and dislikes. These notes are considered to be of great value in educational processes (Aires, 2011). Other materials like sketches or exercises proposed in class to register students' opinions or ideas can also be collected and later analyzed. When a learning environment is set where certain amounts of documents and information are provided by the professor, these materials are also important references to define the richness of content provided to students and the level of detail of the information.

Log analysis

When using online platforms, where students need to login, data can be collected and

used for research purposes with participants' consent. These logs can inform, or at least suggest, about how often, for how long and with what intensity any student uses the systems.

Quantitative methods

Questionnaires

A questionnaire is a list of questions which informants answer on their own. These "self-completion" instruments can be handled by the investigator or, most often, posted to the potential respondents. Recently, they are made available in online applications and the invitation to reply sent by e-mail. This option can have many advantages. Besides saving paper, it allows the questionnaire to be in a safe location before and after being replied, and the respondent does not have to carry it around to deliver it. For the researcher or researcher team, this can be considered more practical at least processing the results (specially counting the answers).

Questionnaires allow certain techniques which are not possible with other methods, as the type of questions can be much direct or closed (e.g. optional responses, scaling). They are considered good instruments for "mapping" human population and analyzing for instance their potential in specific areas. Not only are they used for describing populations but also for providing means to compare groups or later periods with earlier ones, thus understanding changes over time within groups (Sapsford, 2007). In education research this is generally done to understand students' evolution within a semester or through the development of particular activities. What is generally called diagnosis questionnaires and satisfaction questionnaires are also named in education pre and post test. Questionnaires are generally very useful whenever the population to be described, or the sample groups, is big in numbers, as statistical treatment of collected data will allow retrieving significant conclusions about the population. Still, even with small groups of people, questionnaire may provide good tools to gather information about them quickly.

A survey is appropriate in many circumstances, in this case as a part of the process of developing knowledge about a subject area. Focusing on a clear problem or question may facilitate defining the technical and formal aspects of the research defined in order to develop valid research arguments drawn from collected data. Researchers doing action

research or DBR should bear in mind that their work will certainly influence others and should ask themselves what harm could result from the research and therefore design their investigation to avoid it or minimize it. Protecting data in most educational research is generally required to allow anonymity of the participants, as their opinions can often be personal.

> *"Like any other activity in which we take part, we ought to be aware of and influenced by the likely consequences of our thinking and our actions for people, groups and social processes and to have some inkling that our work is a continuum of social history and a contribution to creating the history of the future." (Sapsford, 2007, p.12)*

Simple questions about certain themes may bring to participants' attention certain issues being studied. Eventually these questions will contribute to their own self knowledge and awareness about certain topics.

3.2. The research project design

This study follows the described design-based research methodology. Consistent with this methodological approach, the study has been developed considering its repetition in cycles in two different universities. Initially there were considered as possible participants professors from two universities associated to the doctoral program[54] with research interests as well as the courses they teach with some relevance to the subject of the present study. The chosen professors that were interviewed taught a varied of undergraduate courses related to media studies, design and multimedia production. The choice was taken due to the intention that both students and professors had learning and teaching objectives significantly associated to the ones initially conceptualized for the model.

Two professors, both having some previous experience using the Korsakow application and several years of teaching hands-on courses, volunteered for these projects. One of them was a lecturer in the University of Texas (UT) at Austin and the other, in the University of Lisbon (UL) (ending her PhD in the UT Austin | Portugal program). The students from one course were mainly in a media production graduation and the students

[54] The doctoral program in which this thesis has been developed (UT Austin | Portugal) involved UNL, University of Porto and UT at Austin that offered an exploratory visit to the campus.

from the other were in an art and multimedia graduation. Both courses particularly justified the learning objectives, related to emerging new media formats, and this was also part of the interest of working with these professors in these research projects.

Before entering in detail about the implementation of the study, this section proposes a description of the initial model and how some adaptations were considered.

3.2.1. Research study objectives

The first and second chapters already identify the problem considered for this study; the contrast between instructional models, most frequent practices used in class and the activities and uses developed outside classes concerning mainly the use of digital media. To develop consistent research within this context, some objectives wave been outlined:

1. Define, implement and evaluate a teaching and learning model that supports the development of digital media skills and attitudes concerning the use of digital media and the internet in class;
2. Define guidelines or ideas for the development of the application used for learning contexts;
3. Define guidelines to support and guide future implementations of the instructional model.

Answering the research questions, already presented in the third section of chapter one, leads to the achievement of the broad objectives of this study.

First objective

The three first questions of this study are mostly concerned with the evaluation specified in the first research objective. They focus on the outcomes regarding the support given to the development of attitudes and skills, taking into account the teaching and learning model already presented that articulates three distinct vectors of approach to digital media. (1) One vector of approach concerns the contribution of digital media in semantic based format for conceptualization and storytelling development. (2) A second one explores the use and appropriation of online available digital media tools and materials for learning purposes. (3) And a third one aims at networking as a learning environment to support communication and meaning construction.

Second objective

The fourth question is due to an intention to understand the limits of the main application proposed in this project in what concerns usefulness and usability within educational contexts (4). Korsakow authoring system was not designed with the intention to be an educational technology or to develop educational materials. Some developments may result in a better adapted system to be used in class or in other learning contexts. Also, as a still recent application, it was considered that some further user testing would eventually contribute to detect or reinforce usability issues associated with the interface.

Third objective

The fifth and last question focuses on improvements to the instructional model taking into account the possibility for future implementations in the same or in different educational contexts (5). The objective is to set some design principles with some degree of flexibility to allow others to adapt the model to different scenarios or to different priorities in terms of the main pedagogical objectives, as may be thinking or communicating skills or other curricular objectives.

3.2.2. The teaching and learning model

The teaching and learning model defined in this study proposes the use of the internet as a complement to the educational environment, providing materials, applications and services to allow exploratory learning activities, the use of free and open-source software and online communication to share information, results and comments on the developed work. The initial model will be defined by setting design principles, pedagogical objectives, students' activities and recommendations to guide teachers.

Instructional design principles

The instructional design principles derive from the articulation of already mentioned educational models and theories. The model proposes:

- Centering learning activities in students – developed projects are managed to allow some level of autonomy in order that part of the learning processes depend on students' options;
- Encouraging students' exploration – the subjects, contents and depth of

exploration is not entirely defined, therefore students are encouraged to seek their own interests, sources, and develop their research and work with some autonomy;

- Emphasize processes – valorizing the knowledge acquired in the process of achieving a solution and not only the solution;
- Promoting cooperation and participation – promotion of teamwork and peer-to-peer support is considered for the development of most exploration and discussion activities;
- Defining teacher's primary role as a guide – the teacher presents herself/himself not as an expert in the use of the application but rather as a facilitator and advisor in the exploratory work, creative work and discussion;
- Teaching to learn – project development autonomy, self-organization, curiosity, critical thinking, negotiation and mutual help among peers is supported and encouraged.

Pedagogic objectives

The pedagogical objectives were defined accordingly with notions, competencies and attitudes associated with the use of the internet in a participatory way following some of the skills identified by Jenkins (2009):

- **Exploratory engagement** (*Play*) – The capacity to engage in exploratory endeavor and to solve problems with limited guidance;
- ***Appropriation*** – the capability to select, combine and reuse others' contents in one's own project in a meaningful and responsible way;
- ***Distributed cognition*** – the capacity to interact meaningfully with tools extending mental potential;
- ***Collective intelligence*** – the ability to find and discuss information and knowledge sources with others to achieve common goals;
- ***Judgment*** – the ability to evaluate the reliability and credibility of different information sources;
- ***Transmedia navigation*** – the ability to follow the flow of information across multiple modalities;

- ***Networking*** – the capacity to search for, synthesize, and disseminate information within communities;
- ***Negotiation*** – "the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms" (p.4).

Besides some of the set of skills presented by Jenkins et al. (2009) two additional skills were considered that are particularly oriented to the use of both storytelling and semantic hypermedia authoring tools:

- **Multi-linear storytelling** – the capacity to interpret, follow and create meaning within fragmented narratives in multi-linear hypermedia;
- **Semantic hypermedia coding** – the capacity to structure media according to central ideas conveyed in a fluid purposeful way.

These objectives are not set as exclusive. Before the implementation of the model, other objectives may be included in the discussion with the class professor.

The semantic hypermedia project settings

Research objectives don't need to be clearly defined for students and neither learning objectives. However, discussing with them the set of skills proposed by Jenkins may be an interesting activity and may allow students to think about what those skills mean to them. What should be clear to students though, is what is expected from them throughout the project development and what the main final goal is as well as the amount of time they will have to accomplish it. The project was calculated to last twelve class hours plus twelve hours of home work distributed in four to six weeks.

What is proposed to them is complex and challenging; therefore it requires some level of structuring. There is not a simple answer to the problem students face when challenged to create a hypermedia project with an application that they have never used before and a new structuring format which most of them never heard about. To help students achieve this objective in a small amount of times some important issues should be particularly considered:

- Briefing of the project;

- Initial discussion;
- Final discussion.

The first exposition should start with a short presentation of the research project by the investigator. In this first class, important concepts and examples of interactive video should also be presented. Along with these presentations, the challenge of developing an interactive video should be proposed. A short presentation of the Korsakow authoring system should be made showing the interface and the online support pages, including the tutorial example.

The second important intervention should be scheduled for the following session. The class dynamic will require students to meet the investigator in a group of about nine students around a table. This focus group will be led by the investigator, who will moderate a discussion about multimedia, web design, the semantic web and web awareness. Some open questions can set the discussion about these subjects and will allow to share common notions and understanding among students. After this discussion but still in the group session, an activity should be proposed to allow students to engage in conceptualizing keyword maps and share common vocabulary. The activity is further described as a focus group in the last section of this chapter and in a script available as annex to this work (Annex 11). The main objective of this drafting activity is to make students realize that in any subject, keywords and main concepts are interrelated to each other and should have meaning to others. This activity is also set to bring attention to the importance of keyword choices in a semantic hypermedia project. Accuracy in choosing concepts and their connections may be compared to choices of keyword linkages to structure media segment as nodes in a web.

The last class or classes (depending on the number of projects) should be dedicated to presentation and discussion of students' work. Students present their projects in class allowing others to interact with their hypervideos. Students should comment each other's works and consider possibilities of improving them. In an implementation of this model without the researcher, the second activity may be done by the professor alone or by a teaching assistant.

Project phases and provided assistance

To help students achieve their objectives, the activity is structured in a project-like format. The level of detail in setting sub goals and project phases may vary, but a roadmap is proposed as well as suggestions for required assistance. From the students' point of view, the project has three main phases already indicated in the first chapter simplified here as:

1. Research and exploration;
2. Design and development;
3. Presentation and discussion.

Research and exploration

The first phase is dedicated to research and exploration of a subject of relevance for students. Students can be given a subject related to themselves directly, choose from a set of subjects or choose a subject which should be accepted by the professor. In this phase, students should define topics to address, search them in the internet, and collect materials which they will use in their projects. At this stage the professor should encourage students to present their ideas and findings to develop their projects. The professor assumes the role of facilitator and promoter of good practices concerning research and appropriation of materials. General notions of copyright should be presented and the professor may advise students to use services and applications to manage their references (e.g. *Delicious*, *Diigo*, *Zotero*).

Design and development

The second phase is dedicated to production. In this phase, students design and develop their semantic hypervideos considering the following activities:

- Thinking about and defining semantic structures to organize the subject topics;
- Developing media segments associated with subject topics;
- Assembling media segments in the hypervideo authoring system;
- Publishing online elements developed in the creative process.

In this phase the professor should ask students to define articulation structures for their materials and main concepts of their projects. Students may be encouraged to use

mapping applications as *Veu*, *cMaps* or *Prezi*. In this phase, the professor should follow the visual representation that students develop with their distribution of concepts and ideas. The professor should be able to provide assistance in basic video editing and in the use of the hypermedia application. Though, it is suggested that when confronted by students with problems which are well described online, or which other students already overcame, the professor should distribute the work promoting autonomy or peer-to-peer support. The professor may have the opportunity to stimulate students' thinking attitudes regarding their hypervideo, promoting reflection about:

- Seeing their target audience as users instead of audiences;
- The user as a participant subject and co-author and not as passive follower;
- How to engage users to interact and keep their interest;
- The way in which the project will be experienced.

Presentation and discussion

The third and last phase is dedicated to presentation and discussion of projects. In this phase students should present and discuss their projects with each other and consider ways to improve their work. In this phase, the professor should support and moderate reflection and discussion over each other's works, providing his own comments and reflections over other examples as well as suggesting ways of structuring reflection and the presentation of comments. This can be done, for example, by providing elements which may be considered relevant in the discussion:

- Interface usability;
- Navigability and structure logics;
- Technical quality of video and audio;
- Benefits or hazards of interactivity;
- Interpretation and meaning making.

In this phase, a discussion over chosen subjects and topics may be associated with students' options in setting keyword structures for their projects. This discussion may provide opportunities for students to enhance their abilities to adjust and understand other's points of view on addressed issues.

3.2.3. Korsakow application characteristics

There are many applications that allow the development of interactive multimedia, however none of them combine the characteristics that Korsakow offers. To justify the choice of Korsakow as the main application for this research project, it is convenient to explain how it works and what can be done with it.

Korsakow, as we have seen, allows creating interactive videos where certain video segments are related to each other, as in a database interactive video, but also setting rules for sequencing options. To develop an interactive video using Korsakow, the author should have already edited video segments. In other words, Korsakow is not a video editing application. It does not allow setting transitions or manage a time line. The way to organize and structure video segments is achieved through attributing keywords to each of them. Two different kinds of keywords should be set for each videos segment. The first kind of keywords is the "In-keywords" and the second type, the "Out-keywords"[55]. In-keywords are supposed to be like tags associated to the content in the video segment. Out-keywords define what keywords should have the next options proposed to the user to see afterwards. The main challenge to the author is to set these keywords taking into account that a sequential connection is established from a video which has a specific out-keyword to any other video that has the same keyword as an in-keyword.

An interactive video done with Korsakow is defined by the system as a K-Film. For the final user, a K-Film is an interface where a video is shown in a main screen and by default three thumbnails will be summoned by the system showing a preview of the three optional video segments for the user to choose, respecting the rule which states that the video segment options will have one in-keyword matching one out-keyword of the video they are visualizing. This form of structuring media is what in this work is considered a form of *sequential semantic hypermedia*. One other term used by Miles (2012) is "relational media", which also emphasizes Korsakow's potential to structure information defining "what follows what". The most important difference, when compared to most traditional hypermedia, is that media objects are structured in an adaptable and flexible way instead of being linked with fixed sets of hyperlinks. Another characteristic is that this form

[55] In and Out-keywords are the terms used in the Korsakow system, as well as by developers and authors. Along with SNU and other terms, they will be used in this work without quotation marks.

of linking is directional. In other words, it allows creating sequences that are considered of great importance in narrative structures, as already argued by Bordwell (1985). In a nutshell the great advantage of Korsakow is to facilitate the combination of highly flexible structures with the opportunity to develop sequential narrative formats. This way to structure in fluid sequential format was not found in any other application, commercial or free, or in hypermedia applications studied or described in educational projects. There are some much more complex applications that allow to structure video segments with similar architectures (e.g. *Storyspace*[56], *Adobe Flash*) that were and eventually still are used in education. However, their interface and simplicity for setting their structure is much complex. In *Adobe Flash* for instance advanced knowledge and programming language skills (e.g. Action Script) are required to achieve this structure or effect.

> *"An engine like Korsakow is, at heart, a system for the production of relations, a machine for making patterns" (Miles, 2009)*

Allowing this structure setting was the main considered factor to choose Korsakow as the authoring tool for this project, other factors contributed to the choice of Korsakow:

- The application is recent – highly probable, it is a novelty for all students and therefore all will be challenged in a similar way (the application was created in the year 2000 but the most accessible versions were developed in 2008);
- The media format is recent – the way of structuring media in this format is also recent and has probably never been used before the digital age;
- The application is open source and free – there is no need to pay to use the application in educational or small budget projects, also the contributions of the research or from students regarding for instance the interface usability will favor a non-for profit project;
- The application is video-based – it allows the use of different video formats and generates dynamic video previews with animated thumbnails;
- The application has a simple interface – interface usability and simplicity allow students and professors to experience the application potential without investing too much time learning technical aspects or learning any coding

[56] Storyspace web page: http://www.eastgate.com/storyspace/index.html

language;

- The media structure allows incremental logic – as created in database formats, developed interactive videos can be expanded without the need to alter existing contents or the existing structure;
- The structuring format allows much complexity – the application enables "programming" diverse and complex navigational structures and architectures based in simple rules.

Even though it is recent, the application is considerably known in the specific field of interactive media developers, however most known projects are artistic or documentary. Several projects developed with it have been presented in documentary and interactive video shows and conferences[57]. In Berlin, some street interactive screenings were developed by Florian Thalhofer, the creator of the application (Lange, 2011).

The application has been used in anthropology and media courses by some professors. First uses seem to have been made by Professor Scott Wilson (2009) and Adrian Miles[58], already mentioned, some other professors have more recently been named in the Korsakow project web page (http://korsakow.org/). These professors also point out several characteristics that made them want to use Korsakow instead of any other tool. In summary, they find that the Korsakow system is a great tool to make students think about the subjects they are exploring. Wilson (2009) claims that he uses Korsakow in his *New Media Ethnography* class because:

> *"(1) it allows the authoring of multi-linear narrative works through the tagging of video clips with times keywords, (2) it does not require any advanced programming knowledge (...), (3) [it] is free, open source and available for download" (...) but also because Korsakow software is "good to think with in the classroom as we prepare a new generation of anthropologists to deal with a world of saturated with digital video, sound and image." (p.45, 47)*

He finds that Korsakow provides an authoring system that allows to structure media in ways which are consistent with some relevant ideas for ethnography. Wilson (2009)

[57] RIDM Montreal International Documentary Festival (http://www.ridm.qc.ca/en). This was one of the last screenings in a festival, but several shows by many artists have taken place in Brasil, Europe or Australia (http://korsakow.org/blog/)
[58] Adrian Miles web page about his teaching activity (http://vogmae.net.au/vlog/teaching/)

presents two metaphors that provide an understanding of what he believes supports his claim; anthropology classrooms should move beyond written text and text-centered multimedia platforms, and toward navigable new media ethnographies. The first metaphor was introduced by Deleuze and Guatari (1987): the "rhizome" associated to new models and perspectives to consider society and political structures within the possibilities of horizontal proliferation of connection instead of dominant vertical hierarchical ones. The second metaphor is the "parallax effect" that values multiple perspectives (different angles) to support the understanding of socio-cultural events and processes.

Each professor may find interesting some particularities which are part of Korsakow features. For instance, Wilson (2009) made reference to the possibility to make time setting for the presentation of options to the user. This feature allows the author to control in which part of the video specific options are presented. For example, if the video in the main screen is about a person meeting other people in a bar, it is simple to define that whenever a new person is presented in screen, a new option is presented to the user which will allow him to follow a video about that person. Miles (2011), for instance valorises the possibility of defining how many times each video segment can be seen in a K-Film, controlling the number of "lives" each one will have. He also uses in his projects the possibility of controlling the "rating" of each video segment, allowing it to be prioritised in relation to other video segments and therefore to be presented to users more often (2009a).

Final User Interface

To better understand how Korsakow system works and clarify some terms in both author and final user interface, a schematic representation of the final user interface is proposed in figure 2. Figure 2 shows the "Main media" screen where media segments, or as named by the system, SNUs (Small Narrative Units), will be displayed and three spaces for SNU thumbnails or "Previews" will be presented as options to the user.

The interactive videos edited with Korsakow, as already mentioned, are called K-Films. These are composed by video segments which after being included in the project with keywords, become what is called SNUs in the system. SNUs are connected by keyword affinity, respecting the already mentioned sequential order from attributed out-keyword to in-keyword.

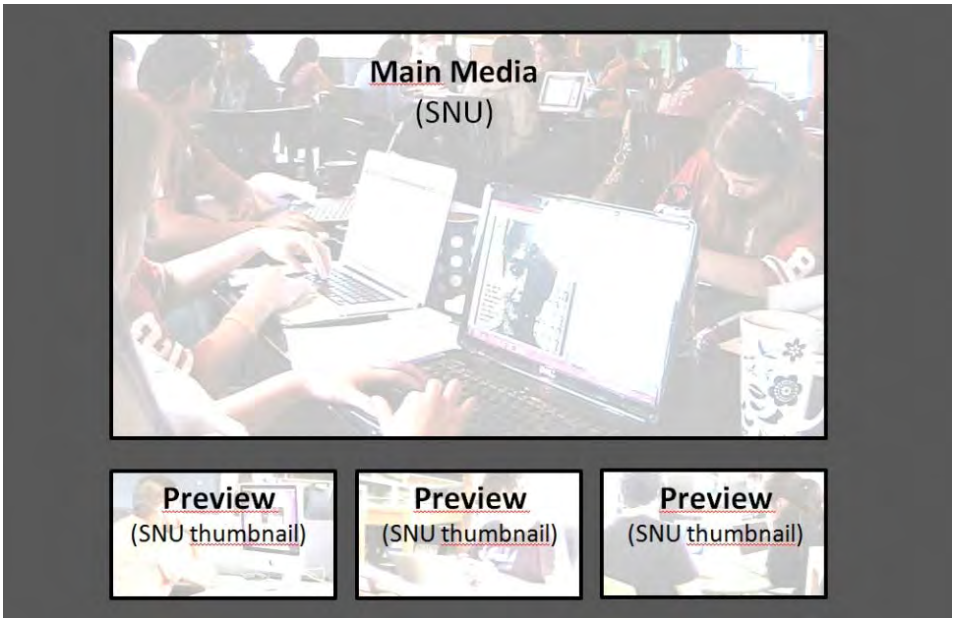


Figure 2 - Korsakow systems default final user interface

K-Film structures are generally impossible to map, as the amount of options are too many to be represented on paper. A most accurate representation for the majority of K-Films would be a cloud with a starting SNU and an end SNU. However, for explaining purposes we suggest a hypothetical K-Film representation with a possible path which could be followed by a hypothetical user. The SNUs in the K-Film represented in Figure 3 would then be distributed in four categories with five SNUs each. Used keywords for each category would be “air”, “earth”, “water” and “fire”. Each SNU would have one of the four elements as in-keyword and only one out-keyword to allow the creation of a cycle from “air”, to “earth”, to “water” to “fire” and to “air” again. To set this cycle, SNUs on the subject of *air* would have “air” in-keyword and “earth” as out-keyword. SNUs on the subject of *earth* would have “earth” as in-keyword and “water” as out-keyword and so on. Figure 3 also shows an introductory SNU and an ending SNU, with arrows representing a hypothetical navigation path through it. Figure 4 shows the sequence of videos as they would be visualized by the user.

K-Films always have an initial SNU but can have one, multiple, or no ending SNU. Many configurations may be set but if there is one ending SNU the K-Film will eventually end after that SNU. If there are multiple ending SNUs the K-Film will end after any of

them. If the author defines no ending SNU the K-Film may end when the user has seen all the existing SNUs. The author can also set the number of "lives" of each SNU to be "infinite" and in this case the end would happen when the user chooses to end.

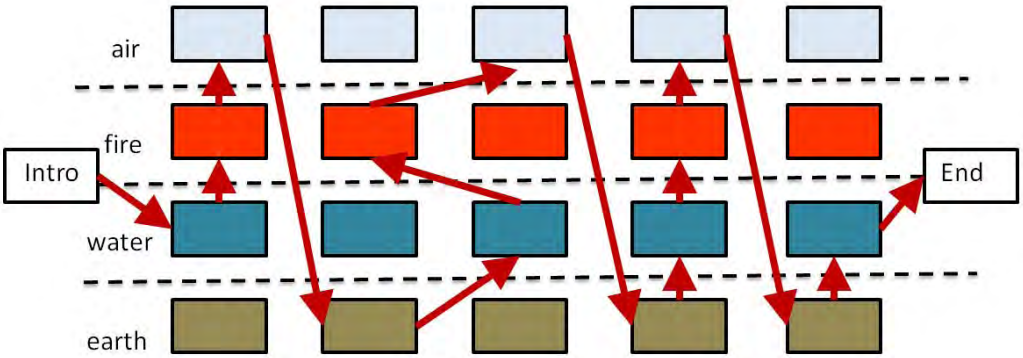


Figure 3 - Representation of a K-Film with four categories of SNUs and a possible user path respecting a sequencial keyword structure water>fire>air>earth> water. Adapted from an image by Wilson (2010, p.10).

Figure 4 - Representation of the cyclic sequence of visualized SNUs from K-Film example in Figure 3.

Authoring Interface

Korsakow's authoring interface provides one main window for overviewing and managing all media segments and interfaces existing in the project (Figure 5), which are presented in the left column. In this window, in the columns to the right, it is possible to see which media segments are already codified with keywords (the system term is "SNUified"), which ones have previews defined, which ones are set to be the "Start" and "End SNU", the number of "Lives" and which interface is attributed to each SNU. This window presents a menu bar with access to "File" properties, "Edit" configuration, "Toolls", "Language" setting, and "Help", which provides access to tutorials and version specification. When opening each media segment or SNU, a "SNU editor" window is presented (Figure 6) and by default, when the first media is opened, it also displays a window with an identifying chart with created in and out keywords (Fig. 6). Clicking in an interface opens an "Interface editor" window (Fig. 7).

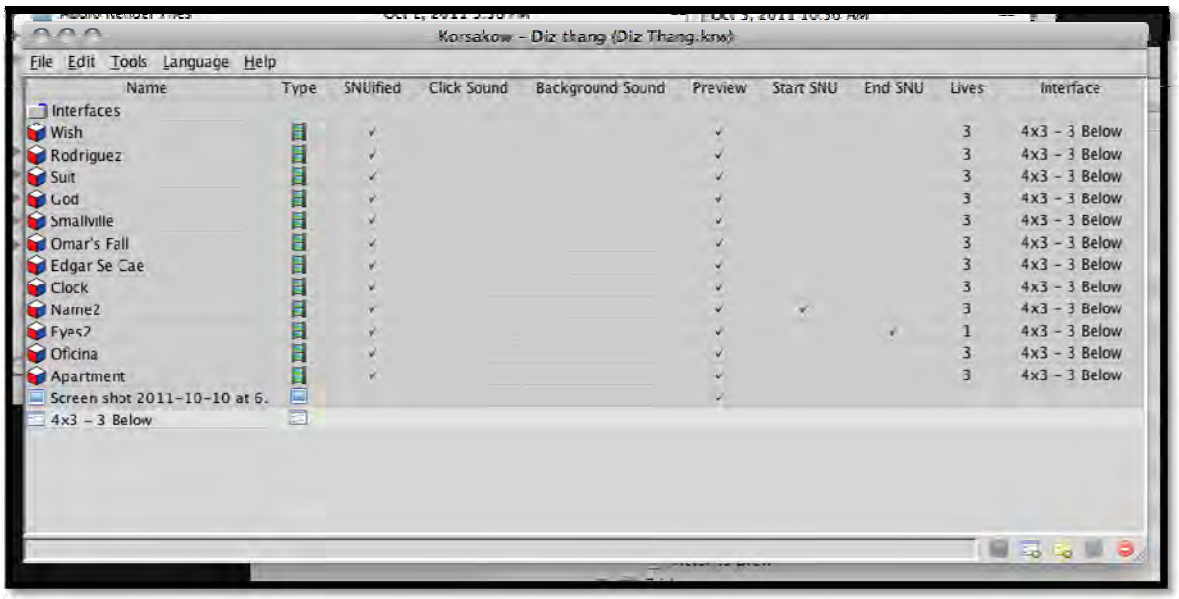


Figure 5 - Main Korsakow interface

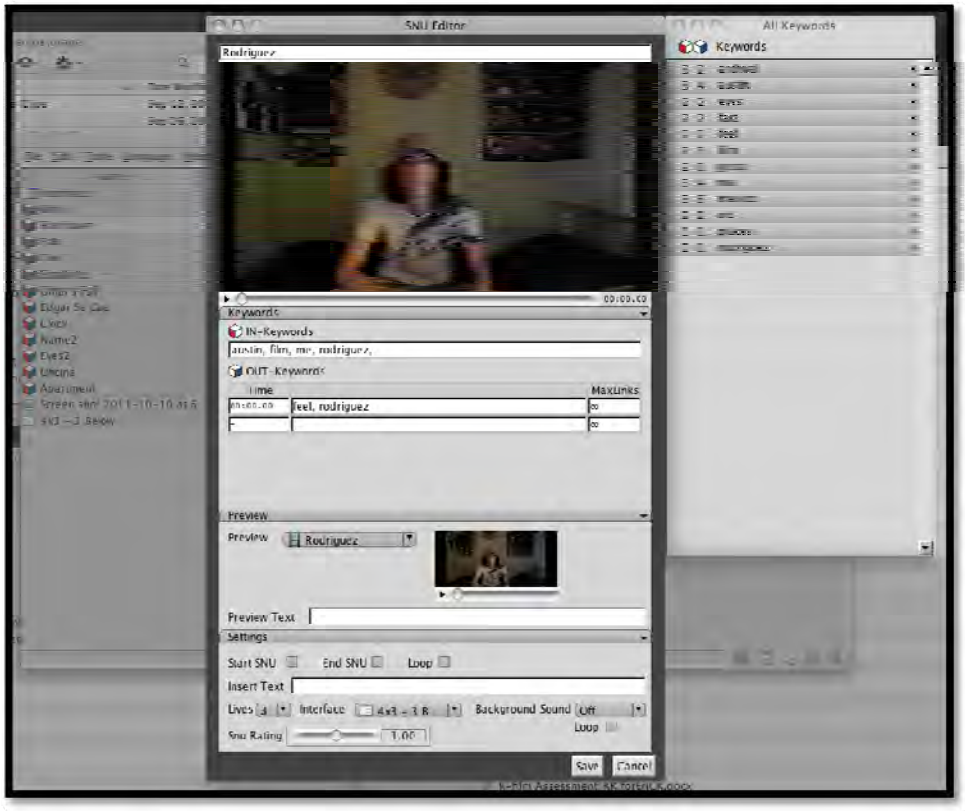


Figure 6 - SNU Editor and list of all keywords (to the right)(Main Korsakow interface in the background)

In the "SNU Editor", it is possible to visualize the media in the top window with its name in the above field. Besides video segment, images can be used as SNUs. The first

fields below are fields for setting in and out-keywords. In the out-keyword fields, it is possible to define the time associated with each keyword or group of keywords. The following sections are optional. The first one shows the Preview that will display as thumbnail options for the final user. By default, it is a sample with the initial seconds of the video segment. It is possible to exchange it with other sample or with an image. It is possible to define a text to show along with the preview. In the following section, it is possible to set this SNU as the starting SNU, the ending SNU or to set it to loop until the user choose to see another segment. In this setting section, a text can be define to be presented as a title of the SNU, the number of "Lives", the "SNU rating", which interface to display with it, and still additional "Background Sound" if desired.

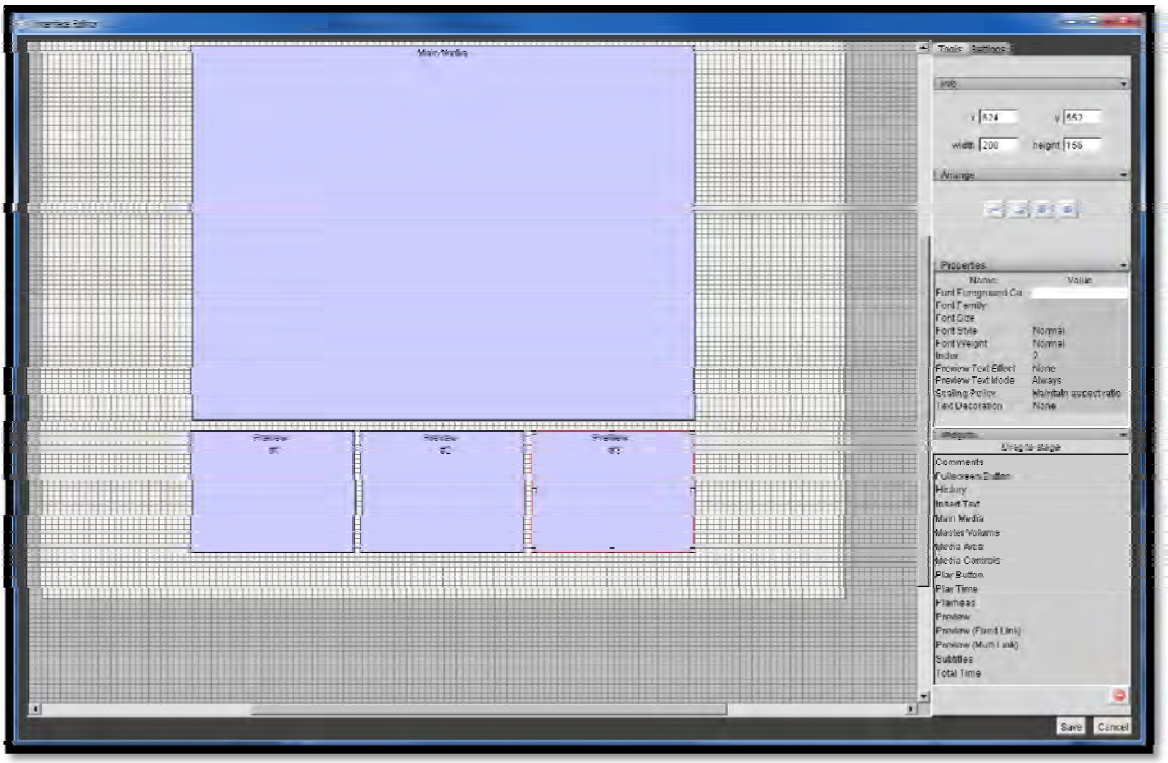


Figure 7 - Korsakow's Interface Editor.

The "Interface Editor" (Figure 7) allows composing the final user interface display adding and displacing Preview boxes and changing their sizes. At the right there are several widgets that can be added to display additional text, subtitles, button to set full screen mode, among the most use. Also, in the right are displayed the settings and properties associated with the whole interface or with each selected widget.

3.2.4. Research protocol

Before presenting the research project as it has been implemented within the courses, a presentation of what was done before the interventions, as well as what has already been prepared in terms of research tools and designed research methods, is proposed here.

Initial ideas for the research proposal

Initial ideas to develop the research project were discussed with professors from the Digital Media UT Austin |Portugal doctoral program at Universidade Nova de Lisboa (UNL) when still developing the curricular part of the program. Further details have been discussed with other researchers and practitioners from diverse fields such as Media Studies, Media Production, Design, Science Computing and Education, both in Portugal and in the University of Texas. The contributions have supported the design of the research project and have been of great use in finding interesting references to complement the literature review.

Before meeting potential professors to develop the research intervention, some ideas were set as the central objectives to be explored in the study. Not only central ideas about the instructional model had to be expressed, but also the main ideas concerning the research methods to be used. The main ideas proposed were:

- The project should allow students to explore a subject of relevance to them or to choose from a list of topics presented by the professor;
- Students should use the internet for searching information and collecting materials to use in their projects;
- Students should think and define a semantic structure for the subject they are exploring;
- Students should edit some video segments;
- Students must create their interactive videos using Korsakow;
- Students should use the internet to publish their work and discuss it;
- Intervention should last at least four weeks;
- The investigator must propose research interventions as focus group participative observation sessions, interviews, and questionnaires.

Choosing professors to develop the intervention in real contexts

After defining the research proposal, the need to choose the professors and courses to develop it arose. For this research study, the investigator opted for courses in the field of media, design and multimedia production. This was considered so that the intervention was less disruptive for the professors and easier to adapt with course objectives. Four professors were chosen as they demonstrated their availability and openness to the research project. All of them had some experience with media production and this might have caused them to be less reluctant to the use of hypermedia tools. Although all of them had declared their interest in participating, two of them, due to issues unrelated to the project, were not able to take part in the study.

The two professors that accepted cooperating in the study in 2011 belonged to the Radio Television and Film Department (RTF), at the UT Austin, and to Faculdade de Belas-Artes at Universidade de Lisboa (FBAUL).

Research Protocol Design

Apart from the research proposal, a research protocol was developed and approved by the UT Institutional Review Board. The research protocol defined several actions and procedures that were later discussed with the professor. It implied the investigator presence in class for participative observations, voice, video or image recordings, interviews with the professor and questioning students, one focus group session and a pre and final questionnaire with students. Scripts for the main research interventions were also part of this protocol as annexes. The main research interventions are described here with some detail along with the techniques that were considered.

Class participation and observation

The observation of class development was defined in order to allow the investigator some opportunities of intervention. The investigator should participate in class as a researcher and as someone who could provide some help with the use of the main application Korsakow. Ideally, the classes would be recorded in video to provide additional data and photographs would be taken. In regular classes, the investigator should not assume a central position but rather a peripheral one, letting the professor manage most of the

instructional activities. During most class time, the investigator should be available to provide help to students when asked. Occasionally, the investigator should move through class showing his curiosity about students' ongoing projects. When possible and disturbing the least, the investigator should collect elements which may show students progress in their work and take notes regarding students' attitudes, opinions or relevant interventions. Video recording should provide a panoramic view of the class and in some occasions close on some particular student activity.

Participative observation sessions

Usability testing is widely used to develop and improve applications or online interface design. User-centered design requires users to be involved in the design process and with relatively simple procedures, human-computer interfaces can be tested (Dicks, 2002). Sung Heum Lee (1999) presents several dimensions which should be considered in usability testing:

- *Learnabillity*
- *Performance*
- *Effectiveness*
- *Flexibility*
- *Error tolerance & System integrity*
- *User satisfaction*

He also summarizes some procedures and techniques to develop it:

- *Observation*
- *Thinking-aloud*
- *Video Analysis*
- *Interview*
- *Questionnaire*
- *Auto Data-Logging program*
- *Software Support*

The last two methods that imply dedicated software were not considered for this study. To apply the remaining more common methods, it is however recommended to plan

and prepare materials (Lee, 1999). Interviews were not prepared, but rather considered some questions within specific context regarding the application use. The developed questionnaires included questions to support the choice of participants for the observation session and provide clues about user satisfaction and application usefulness.

Participative observation sessions with some students should be done with one student at a time by the computer using Korsakow software. Two of the main purposes of these sessions are to test the interface usability and at the same time, the student's ability and understanding of main keyword structuring logic. Students should be asked to participate in this session before they explore in depth the application. The session may be done in class or scheduled with the student according to his/her availability before or after the class. The session should be recorded in video in order to capture the screen activity and what is being told. Students should be asked to *think-aloud* and minimal guidance should be given when the student is unable to perform the task alone or asks for help. A protocol with additional recommendations and the proposed tasks is available in Annex 9 (A.9).

Focus group session

A group session should be scheduled with the students and the professor. For research purposes, the session should include about nine students and it should be led by the researcher following the focus group script available as annex (A.11). The researcher should focus on what the students know about the addressed topics and what their attitudes are toward the same subjects. In the script, group activity is proposed where the researcher should observe students' attitude and difficulties in performing the required tasks. The activity should be fast paced and time should be set in the moment with students. If more than half the students did not finish the task, additional time should be given. The activity requires them to draw maps that should be collected, scanned and returned afterwards.

Semi-structured Interviews

An initial and a final interview should be scheduled with the professor. The initial one should be done right before starting the activity or in the first days of class. Questions should be open-ended and the professor should be allowed to develop their own line of thought in any of the addressed topics. The objective of this interview is to understand professors' perception concerning the role of technology in education and have some

indications about their experience in the use of technology in class. Some guiding questions are available in an interview script (Annex 25). The interview should take between half an hour and one hour.

The final interview should have about the same duration and be developed after the intervention. The main objective of this interview is to understand professor's level of satisfaction with the model and the use of Korsakow application. Other objective should be gathering opinions and recommendations for future interventions. The topics recommended are also presented in an interview script with suggested questions (Annex 26). As semi-structured interviews, the proposed questions are set to guide the researcher, and questions may be posed in different order to allow better transition between ideas as in a casual conversation. The interview should be done in an informal way and in informal settings. Ideally, the place should be a familiar to the professor but not too noisy for recording purposes. Audio recording should be enough, but if the teacher is at ease with the camera, video is preferable.

Questionnaires

Questionnaires should be prepared to be implemented online and sent via e-mail. The initial questionnaire should be answered as soon as possible during the first classes. The objectives with this questionnaire should be: characterize students in gender and age groups; identify the level of access to personal computers, internet and other digital equipment; expectations toward the proposed activity; learning habits; confidence in usage of the internet; and their uses of the internet, particularly their social networking activity.

In the last day of the intervention, students should be asked to answer a final questionnaire about their experience. The final survey should collect their opinions about the use of the promoted applications, the learning environment and proposed activities, team work and collaboration, their work and the work developed by others. Questions for both questionnaires may be adapted to the specific contexts but a guiding document is provided as annex (Annex 27). Students are not benefited in any way for their replies and should be told that there are no right or wrong questions. Also, they should be told that the teacher will not be provided with students' individual answers. Students should be reminded in class or by mail to reply the given questionnaire.

Online materials and discussions

Students will be asked to use online platforms to share their work and discuss with each other or the professor. Sharing their content in public sites will be part of students' experience that should be moderated by the professor. The materials should be available for the researcher to collect. Not only the amount of data should be considered but also the quality of shared materials and the complexity level of online interaction and communication.

Analysis and evaluation

Collected data should be considered as the implementation is being developed in an initial analysis that may provide some direction for action or for redesigning some activity or process due to any unanticipated problem. Some diagnosis information may guide the investigator's procedures, as it may be relevant to follow a specific student, or conduct the choice of participants for observation sessions. Replies to the questionnaires should be analyzed through simple descriptive statistics and if relevant, be subjected to further statistical treatment. Collected information should be presented in tables and/or graphical representation with means and percentages. If relevant, statistical analysis software should be used for correlation tests between the values from the diagnosis inquiry and the satisfaction inquiry results. Correlation tests may also be done between collected logs from the LMS or other online technologies and values obtained from the diagnosis or final inquiry for computer use and study hours. The evolution in what concerns ICT skills, the quality of outcomes and overall evaluation of students' performance should be considered and related with the previous experience, satisfaction and engagement in the technologic activity. Patterns of opinions and suggestions will be described to provide recommendations to software changes and learning activity design improvement.

Chapter IV

4. The Project at University of Texas at Austin

This chapter presents the project that corresponded to the first application in a real learning scenario of the central ideas of this thesis. This project unfolds in the University of Texas at Austin conducting to the implementation and evaluation of the learning activity model already described. The project started as there was the opportunity to meet several professors in the University of Texas that showed some interest in the proposed learning activity model and were willing to collaborate with this project. These meetings were made in two exploratory visits to the University as an invited researcher in the end of the year 2010 and in the beginning of 2011. With the collaboration of my advisor, Professor Joan Hughes of the Education College, some adjustments to the research proposal were made as well as to the research tools that were approved by the IRB before implementing the study with the class.

One of the professors that showed more enthusiasm with the discussed ideas agreed to participate in this project as it seemed to her that several of the learning activities objectives matched the objectives for her course entitled *Interactive Digital Storytelling.*

To present this project this chapter will start with a description of the learning environment and then makes the characterization of the project participants. Following this two introductorily sections a third one makes an overview of the developed activities. The fourth section addresses some aspects of Korsakow's performance and design suggesting some developments. The fifth and last section proposes an overall evaluation of the learning model implementation, describing the observed and perceived satisfaction of participants, as well as the learning outcomes and evolution of attitudes and skills.

4.1. Course learning environment

The *Interactive Digital Storytelling* course belongs to the curricular offer of the Radio Television and Film Department (RTF) of the University of Texas at Austin (UT Austin). It is a course generally attended by students from Media Studies and Media Production of the same department. However, students from other UT departments can also enroll. It is a hands-on production course, where students explore digital platforms and interactive storytelling tools. The syllabus mentions that several interactive media productions are presented and studied and that students create their own multimedia projects. The syllabus further mentions that students explore the differences between traditional models of storytelling and digital models. It also refers to *Photoshop*, *Final Cut Pro*, Korsakow, *WordPress*, *Flash*, *Delicious* and RSS as applications used in class. Students enrolled are supposed to have some computer background and have some experience using *Final Cut Pro* application. As required equipment, students should have an external 500 Gb hard drive.

4.1.1. The University of Texas at Austin

The description of the USA's higher education system is outside of the scope of this work; however it would be fair to say that USA is a highly competitive country where schools are constantly being evaluated and ranked accordingly.

Figure 9 - University of Texas at Austin Central Tower.

Figure 8 - RTF' CMA building. Where the UT Austin Project classes took place.

UT Austin is a public state university and one of the best ranked and biggest in United States. It has more than 50.000 students, many coming from other USA states and foreign countries. The campus spreads through most of Austin´s northern city center ("University of Texas at Austin", n.d.). Life quality in Campus and around is high and the city provides high cultural offers. Most of the campus has free wireless broadband available to students and faculty. The University has several museums and cultural centers under its administration, including the Harry Ransom Center dedicated to the acquisition, preservation, study and exhibitions of media and other cultural material[59].

4.1.2. The Radio Television and Film Department

The RTF provides courses with great reputation in media studies and media productions, which are consistently ranked between the best 5 and 10 best graduate and undergraduate media courses in the US. With a great demand for both graduate and undergraduate studies, students enrolled in these courses are among the first 25% of the applicants selected according to highest grades and highest motivation. A portfolio also has to be presented for admission[60].

Figure 10 - CMA lobby.

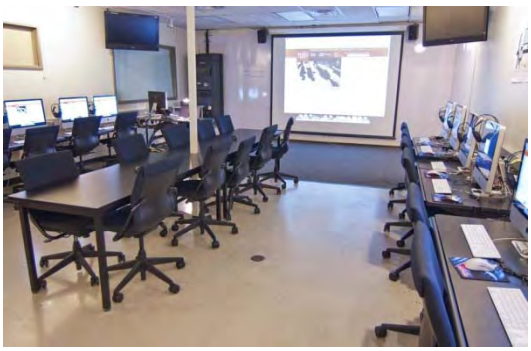


Figure 11 - Overview of the classroom (Digital Media Lab).

The RTF has two main buildings (CMA and CMB) that provide areas for students to meet, several classrooms and studios equipped with computers, other

[59] Ransom Center web page (*http://www.hrc.utexas.edu/about/mission/*)
[60] Information and images (Figures 9-11) are courtesy of RTF and available at the RTF Department's web page (*http://rtf.utexas.edu/*)

hardware and software dedicated to video and sound production and post-production. Professional recording equipment is available to check out (film cameras, high definition digital cameras both for TV and film standards, jib cranes, light kits, etc).

4.1.3. The Media Lab classroom

The Media Lab classroom where the study was developed is equipped with a digital projection system, two TV sets and 16 iMacs. All computers have phones and an external sound card to split it to 4 channels if needed, all of them share a common network server, and have the latest versions of video editing applications as *Avid* and *Final Cut Pro*. There are several DV and HDV reading and recording devices. The classroom is available day and night in a first-come-first-served policy for media production students, excluding class hours where students in class have priority.

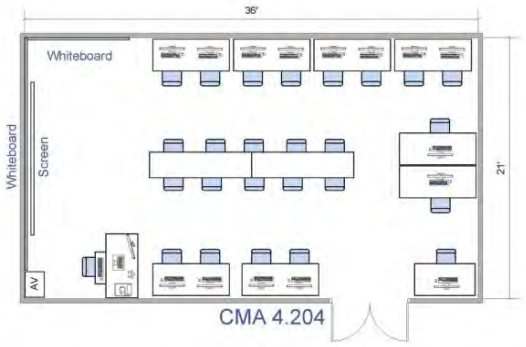


Figure 13 - Classroom floor plan

Figure 12 - Students' workstations

Classes were about 1h and 20 minutes with the professor twice a week and 3 additional hours of laboratory class for project development, with the attendance of the Teaching Assistant (TA). As in most other courses the professor makes available several resources in the institutional LMS Blackboard.

4.2. The research study participants

The participants of this research study were the students, the professor and the teaching assistant. The investigator already knew the professor and had met her several months before to discuss the research project and the possibility of developing it in her

next course. The researcher was introduced to the students in the fourth week of the course, and he described the research study asking for their participation.

4.2.1. The professor

The professor involved in this project has several years of experience with the use and production of digital media and 13 years of experience as a professor. Her experience with multimedia and the Internet is wide having several projects developed in the area of journalism. She is very confident in what concerns the use of digital equipment and applications for audio, video and photo editing. She has experience in using web design tools as *Flash* or *Dreamweaver* and also has experience in the use of Korsakow. Although it was the first year that she introduced Korsakow in her classes, she already participated as professor in workshops using it as final editing tool. The professor was very cooperative and always available to help the investigator in any issue related to the project. She was interviewed in the beginning of the research study and in the end. The professor showed awareness concerning the increased use of the Internet and mobile technologies in education but she believes professors will always have a central role in education. She believes that digital media is increasingly contributing to the evolution of teaching and learning and that one can learn much ("mainly technical issues") with online resources or with other online users with more experience. For this reason, in recent years, when teaching a specific technology, she is less concerned with being aware of all technical details.

In this course, the professor values organization for managing the project, starting with a good management of files and folders in the computer. One other very important issue for her is the understanding of non-linearity in storytelling as one important concept that distinguishes digital media from cinema or television. The research study was enriched by the professor's experience and she had clear ideas of what users expect when dealing with online media.

> *"I hope they are developing another way of thinking about media, and their role… The whole ending thing, like it is ending when the viewer says it is ending, so you better make good SNUs otherwise people will be ending very soon because they won't have time, they will not be interested in making time." (Professor - Annex 1 – Professor*

Initial Interview [PII] – P21)

The professor had a close and informal relationship with students but roles were well defined as the professor had no trouble in keeping the order or in leading the class activity flow.

4.2.2. The teaching assistant

The teaching assistant (TA) had a friendly informal relationship with students and there was no need to put order into the class as students behaved well through all observed classes. When needed he was able to have students' attention to start a new activity or to inform about a collective issue. Students were clearly more at ease with him as he was closer to their age, and of course because TAs are not supposed to participate directly with grading. He was also available to help the researcher in any way and also agreed to do an informal interview in the end of the activity. During the semester, he was in his final year as student in the filmmaking Master's degree and this was his first year as TA. He was very comfortable with computers and as expected he was also skilled in video editing software and filming gear. The main role of a TA is to help students with all their technical problems but he also delivered some classes to give an initial push in video editing software. He was in class during lab classes' hours but was around some other times as he was TA for other classes.

Although not a frequent user of *Skype*, *Facebook* or blogs, he recognizes the advantages for students to be at ease with these services. Besides face-to-face he mainly communicated with students through e-mail if they needed help after classes (Annex 3 – Teaching Assistant Interview [TAI]).

4.2.3. The students

All students agreed to participate in the study and they were highly collaborative with the research. All of them participated in a focus group session and three agreed to be subjects of individual participant observation. They all agreed with class video recordings and were available for informal conversations during class. All students, the twelve that attended the course, replied to the questionnaire administered at the end of the project.

The class had 13 students; however one of them did not attend the course. They were 4 women and 8 men. Three students were between 18 and 20 years old, five between 21 and 23 and four were above 23 (See Annex 8 – Students' final questionnaire [A.8 - FQ], Q1 and Q2). Most were undergraduates however there were two graduate students, having more experience in production and management in areas related to multimedia. In fact, one of them was already pursuing a PhD.

The cultural background of students was diverse. One student was African-American, three students were from Mexico or with Mexican family and the remaning were white/Caucasian. Nevertheless all students were proficient English speakers and writers. Students were well equipped with digital hardware. Eleven of them had *smartphones* and all had one or more computers of their own. All but one had laptops. Also only one student did not have an internet connection at home. All of them were able to record video with their own devices being it a digital camera or HD recording *Smartphone* (A.8 – FQ, Q3 through 7). As a requirement for the class, all had external hard drives where they kept their own projects.

It was not possible to do a pre and post test and therefore in the students' final questionnaire it was asked about their studying and media consumption habits in a regular month in the previous semester and after, during the time of this project development. Differences were not significant and some students replied as they didn't feel any change existed. Nevertheless observing in detail table 2 and 3 one can see that some students find that on average they have studied less in group and a bit more online. As a whole, it seems that students spent less time in activities like watching TV, playing games or listening to music during this project (A.8 – FQ, Q8).

Looking in detail at some individual answers by some of the most media engaged students it seems the computer is quite central in their activities and that they surely overlap activities (e.g. for one student the sum of hours per day by the computer or online would be more than 16). For instance in class students might be editing video while listening to music and having some chat running in the background.

Table 2 - Graph with the percentage of answers to the question "please indicate how much time you spent on an average day" in "April 2011" (A.8 - FQ, Q8).

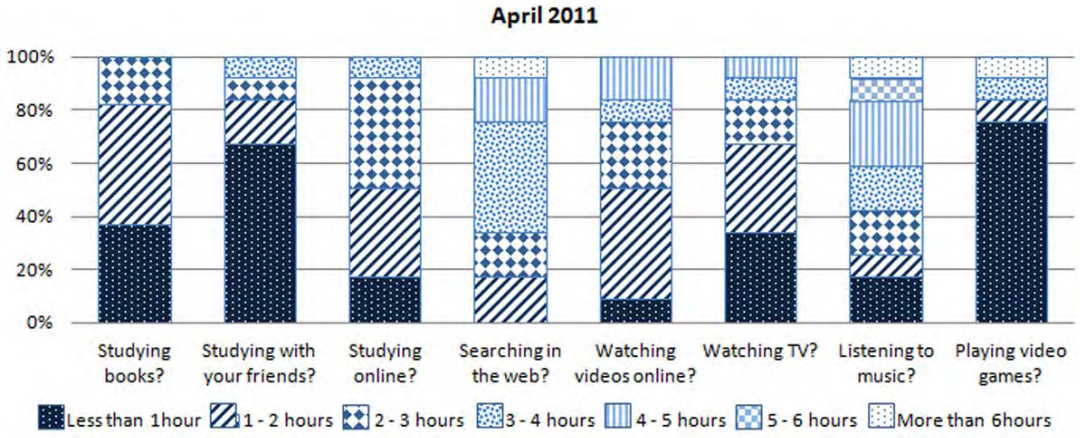
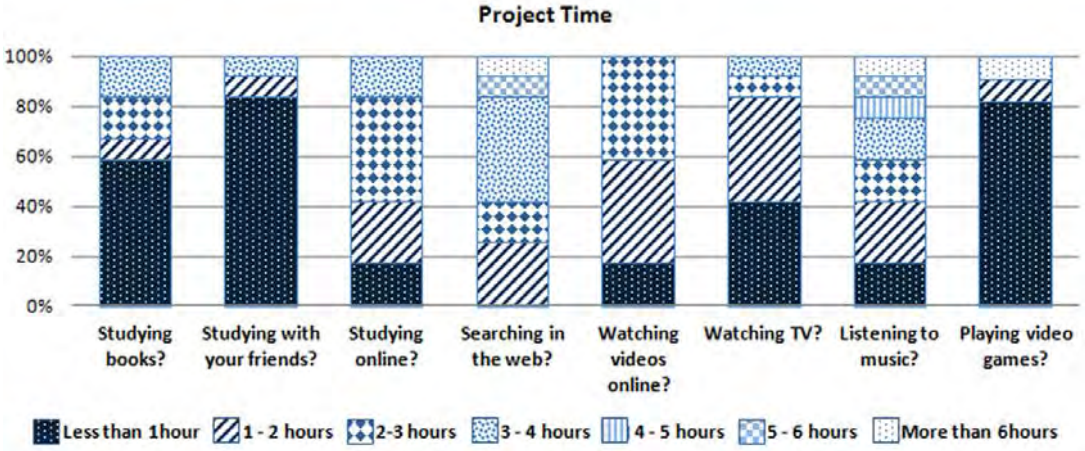


Table 3 - Graph with the percentage of answers to the question "please indicate how much time you spent on an average day" in "during this project" (A.8 – FQ, Q9).



Concerning computer games, most students do not find themselves frequent gamers. In fact, in the questionnaire the majority of them replied that they never played online and only 3 out of all 12 said they would play more than one hour a day. One of these 3 students stated that he plays on average more than 6 hours a day (A.8 – FQ, Q8). He was the oldest in class and he was the student with more professional experience in the field of digital media owning a media production company and showing more proficiency with video editing tools.

Most students had already used interactive video of some sort before the start of the semester, presenting some examples in the focus group session which were not

mentioned by the professor. The interactive video examples presented by students in the focus group session were an interactive movie release in Blu-ray "Final Destination 4" ("The Final Destination", n.d.). with special option menu, and an online commercial for pizzas "*Deliver me to Hell - An interactive Zombie Adventure"* and an online interactive video where users can type actions for the characters to play *"Hunter shoots a bear"*[61].

Two students had already made web pages using Dreamweaver, but besides that, no one had experience in editing interactive content. Most students had heard of Flash before but only one had heard about the existence of Korsakow. Concerning media awareness, most students, 7 out of 12, said that they do not believe most of what they see on the TV. Concerning specifically the use of Internet students seem to have more confidence in what they read and see online than on TV. The level of trust in online content is about the same of what they read in books. This level of trust seems to be associated with a vast offer of information providers and the possibility of quickly cross checking the content in several web pages (A.8 - FQ – Q11, item 7 to 10).

Most students believe that technologies further motivate and improve their in-class learning (9 and 10 out of 11) (A.8 - FQ - Q13, item 1 and 2). In the questionnaire though, some of these students believe that too much use of technology may be disruptive (5 out of 12) (A.8 - FQ – Q13, item 3).

Figure 14 - Student editing video in his own laptop, with headphones and with his cell phone close by.

Students expected most class content would be available online and accordingly with the class syllabus they were expecting most of the work would be

[61] To see the online examples you can follow the links: http://www.youtube.com/watch?v=9p1yBlV7Ges; http://www.youtube.com/user/tippexperience.

done with digital devices and computers.

All students said in the questionnaire that they were intensive instant messaging users. Most said they use the online chat and all of them said they would use their cell phones (A.8 – FQ, Q11 - item 13 and 14). There were four students that most of the times would use their own laptops in class.

4.3. Korsakow's performance, design and development

The way the Korsakow application performed and how it was perceived by both students and professors is relevant to understand its influence in the learning model evaluation that will be addressed in the next section.

Open-source projects as Korsakow, welcome comments and contributions for development and this section presents some preliminary evaluation of Korsakow's interface design and performance and summarizes students' and professors' ideas for development that were expressed. In general, all students found the application easy to use. One student for instance compared it to *Flash* saying it was "easier to use" and that once the videos were made, the project is really quick to assemble.

> *"I think Korsakow is a pretty easy program" (Student – A.7- Blog Excerpt - Blog 2)*

> *"[It] is easier to use than Flash and making a project in Korsakow would not take a whole lot of time once videos are ready to go." (Student - A.7 - Blog 1)*

For students, using in-class open-source applications was a new and well-received situation. Students understood that it is an application developed with the help of the community and with no financial benefits in mind. This made them more tolerant when they were faced with bugs or other program inconsistencies. Although no one has written their comments directly to the developing team, students reported in class several problems they encountered in the application. The version used in this project was the 5.0.5.3 and some issues that were noted were already dealt with by the developers for version 5.0.6, but even so they will also be here addressed.

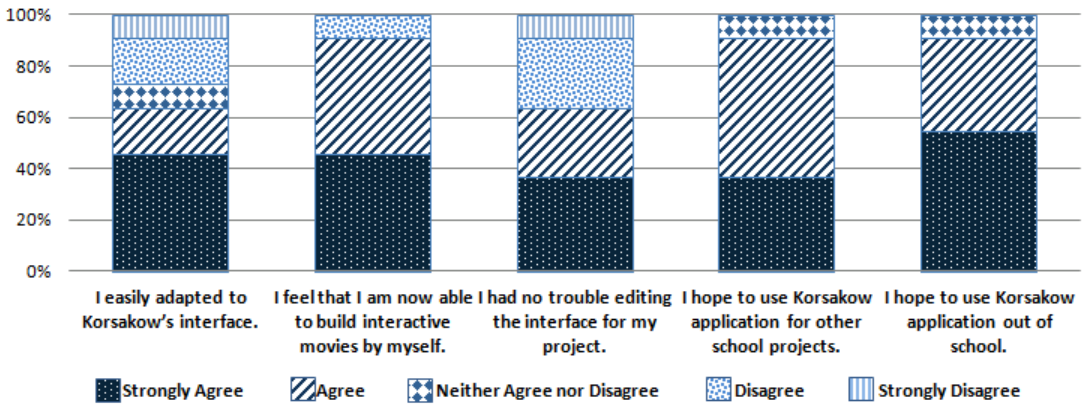
As already mentioned the participant observation sessions were opportunities not only to see how students dealt with the discovery of the application, but also to

evaluate the application interface itself. This actually was presented to students as the main objective to make them more comfortable with the idea of evaluating the software interface rather than their performance. However the test was not extensive as there was no intention to annoy students and take them too much time. The main idea was to establish if the main issues were understood and how obvious were they to the student (for the session script see Annex 9). One less basic tasks was required in order to see how less obvious features can be solved only through interface exploration.

4.3.1. Interface issues

Most students were comfortable with the Korsakov interface for editing their projects. Table 4 illustrates that most students enjoyed the application. The main problem that affected them was related to the final export for the web. Most students were faced with error messages that they could not interpret and even the professor could not understand.

Table 4 - Graph showing student level of agreement to the sentences regarding the use of Korsakow application (A.8 – FQ, Q17).



For some projects, analyzing the keywords options, the professor could see there were words using irregular characters. And at least in one of the projects correcting that was enough for the final project to be exported to the web. In other projects it was easy to notice that the video formats were not well set. But there were at least two projects where the only solution was to re-create them from scratch.

Figure 15 - Student exploring Korsakow's interface in one participative observation (Video frame).

Some other issues were only detected in the participant observation session. These problems were related to:

- **The drag and drop interface** – Two of the three students did not find obvious the drag and drop possibilities for importing materials for the main interface window. These two students were also not expecting it would be the way of creating objects in the interface editing window. (A.9 - Participative Observation Protocol [POP], Task 7)
- **Hidden options** – In the "SNU Editor" as well as the "Interface Editor" there were many options that were hidden. In the "Interface Editor" the number of widgets did not fit the box where they were presented. That did not facilitate finding the things they were searching. The "SNU Editor", for students using Windows versions did not show the options for the Preview requiring the user to minimize the *Keywords section* and opening the Preview section. That was also awkward for these students.

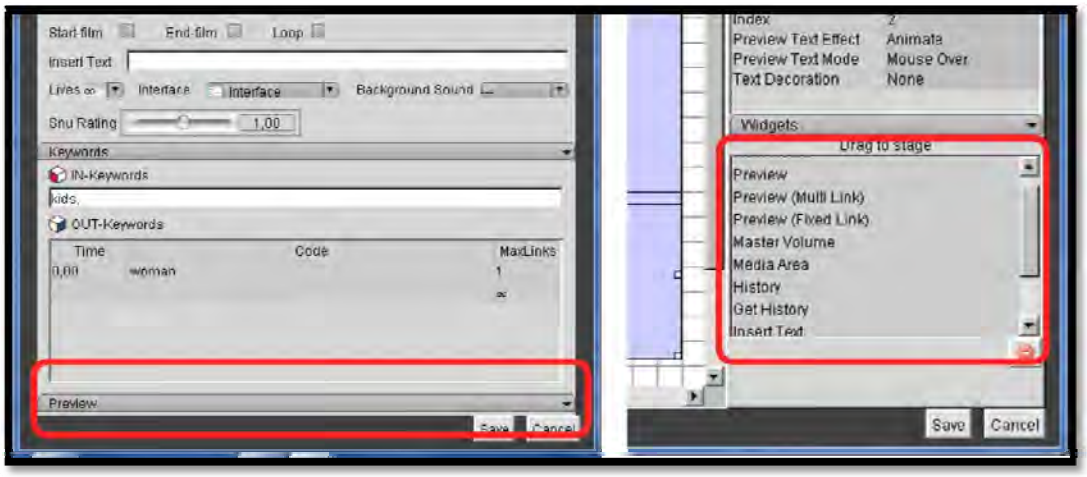


Figure 16 - Options that don't show. The whole Preview options in the "SNU Editor" are hidden (in the left) and a third of the widgets are not visible (in the right)

- **Setting time for Previews' to show up** – The advanced task proposed in the participation observation was for students to set some delay in the summoning of Previews' thumbnails in a K-film. This task took several minutes for all students. All of them needed to be encouraged to make a first attempt and export the project to see the outcome. All tried to change the numbers in the "Time" column but failed at the first attempt as they changed hundredth of seconds instead of the seconds (the "Time" column is showed in figure 15 in the out-keyword setting options, to the right). When changing the hundredth of second students would not perceive a change when visualizing the exported project.

4.3.2. Bugs and other problems

Other problems that puzzled some students were seen as bugs:

- **Installation** – The professor and also one student could not run the version 5.0.5 version of Korsakow in their personal laptops because their operating system was old (it requires for *Apple* computers to be *Intel* and running OSX 10.6+).
- **Setting subtitles** – One student tried to follow the tutorial to set subtitles in his project but could not make it work. When he reported this problem, the investigator could not help him as the tutorial example would not work. In the following day the investigator and one other student found how to make it to work. This student explained it in his blog. The tutorial was incorrect.
- **Choosing video formats** – The main error students experienced was related to the video formats that were not compatible. Most students had to render movies using the preset defined in the "Tips and tricks" Korsakow web page. Most other attempts with other formats would fail in the "Export for the web". *"After working it with some help from the lab aids, we decided that re-rendering the failed videos might solve the problem, and it did."* (Student, A.7 - Blog 4).

- **Exploring widgets** – Some students were curious to use some of the possible widgets presented in the "Interface editor" but for most of them they would get error messages or the exporting session would freeze.
- **Exporting errors** – Exporting errors were frequent. Sometimes closing the project and opening it again was enough for it to work.

"Once in Korsakow when I tried to export the project, it said that it could not export successfully. All I did was close the program and try again and it worked." (Student, A.7 - Blog 1)

4.3.3. Further developments

During this project and interviews some students and professors were asked about what would be good developments for the application aside from solving bugs and already reported problems. The main requests are listed:

- **Better tutorial examples** – Some students would like to have different tutorial examples that could show other structuring options that might help to understand how the application works.
- **Better tutorial** – Some students said the tutorial could be better and one suggested videos showing how to do some of the most advanced options.
- **More resolution** – Some students were upset to have their high definition videos reduced to the standard resolutions available.
- **More video codecs** – The TA found the application a bit limiting to what concerns codec usage as most other than H.264 would not work properly. For him, allowing other formats would be the best improvement.
- **Relocating files** – One student suggested the possibility to relocate used videos or change their names without the need to edit the SNU again.

"I did get an error message at one point. The error was caused by a change in the file names. I had changed the name of my main folder and then my media was unable to be found. I wasn't able to open the project file anymore, so I deleted the old file and started again since I had not done much work yet. There should be a feature that gives authors the option to reset the location of their media, like Final Cut does with the reconnect media option." (Student, A.7 - Blog 7)

In general students enjoyed using Korsakow and all but one hopes to use it in their academic and future professional activities (A.8 - FQ – Q17, item 7 and 8).

"Korsakow is definitely a tool I will use in the near future" (Student - A.7 - Blog 2)

"I do want to use Korsakow for future personal storytelling, similar to Marta's work, as a fun travel journal for other people to explore my personal journeys." (Student, A.7 - Blog 2)

It was the first time the TA used the application and he also said it was really simple and user-friendly and a tool that can ease the work for what it is design for. Nevertheless he pointed out that for personal projects he would still prefer to use *Flash* instead of Korsakow. The main reason for that is the fact that programming is allowed inside *Flash* while impossible in Korsakow.

The professor found that the application was very user-friendly as she believes that it is really useful to use in class for introducing multimedia production. She said that she is still intrigued by the application and does not point out specific improvements.

"I am still fascinated by it!" (Professor, Annex 2 – Professor Final Interview, P36)

4.4. The teaching-learning activities

The initial learning model was discussed with the professor and was adapted and improved in order to fit the existing settings of the course and to increase students' participation. The adapted model oriented the students' project activities to be set in the beginning of the semester. The project was entitled "Multilinear Narrative using Korsakow". The project's theme proposed to the students was "Myself". It was a way for students to present themselves and to allow a quick start for the hands-on production. The set of activities provided a context to introduce a series of concepts regarding interactive storytelling.

4.4.1. Model implementation

The "Multilinear Narrative using Korsakow" corresponds to 30 % of the

overall grading of the course. Students were also evaluated by their blog prompts through all the semester, which would count 20% and further 10% for some laboratory activities. These activities were generally led by the TA and were directed to quickly present some applications or how to deal with specific equipment. During the weeks of this project though, the only lab activity developed was the investigator-led Focus Group session. The remaining grade component of 40% was for the following project that was not studied in this research. That project was also the last project of the semester and was named "Collage/Journey project using Flash". Students were supposed to work in groups to develop another interactive webpage to present some topic or city itinerary chosen by students. In the last interview the teacher was still considering to let students choose between Korsakow and *Flash* but in the end she decided that they should use *Flash*. Besides class and lab hours students were supposed to work on their projects also after classes (in the lab, at home or in other department facilities).

In the first three weeks the professor made an initial introduction to interactive digital storytelling opening the discussion about the theme and proposed the visualization of some examples as well as some readings. Students were asked to create their own blog for the class and publish their first text and video assignments online. Only in the fourth week the professor made the full presentation of the project also introducing Korsakow as the application that they should use for the production of the interactive movie. The idea was that students should have some video segments before starting to use Korsakow. This way of setting the activity allowed that in the fifth week students could start setting their own interactive movie already with their own videos. Also the idea would be that students would know what story they would like to tell before worrying too much with technical aspects. Students were supposed to comment each others' blog posts until the end of the project. As this did not work out as expected (no one was commenting), a final in-class session was set to lead students to comment each other's final projects.

4.4.2. The students' activities

For this project students were asked to develop an interactive movie about

themselves using the Korsakow application and 30 second video segments made with archive videos or with their own recordings. Students were supposed to have already two of these 30 seconds clips before they started using the Korsakow application. Also before starting editing their interactive projects, students were asked to develop for themselves concept maps regarding the most important issues to address in their projects. There were some classes richer in theoretical discussion or professor-oriented conversations about media examples; other classes were more dedicated to hands-on work.

Class discussions

Class generally started with discussions where the professor introduced concepts like narrative arch, open narratives, digital literacy and other topics. Sometimes these discussions could start following specific issues brought to the professor's attention when tutoring some student's project. There were discussions related to project's keyword mapping and discussions about some reference interactive video project. In the last weeks the professor moderated discussions about student's interactive videos. The investigator has done one focus group in the lab class hours. It was mainly a discussion about the evolution of the internet to *Web 2.0*, as multimedia and social networks became more participative. The current evolution to the *semantic web*, called by some the *Web 3.0* was also discussed. After this discussion, students engaged in a group activity to develop concept maps writing keywords relevant to their projects in a piece of paper and then linking them (A.11 – Focus group script).

Figure 17 - Focus Group session (Video frames).

Online search for media

Students were not obliged to use the internet to get videos or photographs to use in their video segments, except for one video. But all students came to use it at least to get audio sample or music clips to add to their own footages. Some students made extensive use of online materials using both video and sound and text they found online.

Video production and editing

Most students filmed their videos for this project but there were also some projects that had lots of earlier recorded videos made by themselves, friends or family. Some projects also made extensive use of archive videos found online. Some students dedicated a significant amount of time on editing their videos with a rich mix and remix of photos, voice-over, sound and video effects, music text and graphics using both recorded materials and online media. The professor set a limit of 30 seconds for each video clip, which demanded an extra effort to make self-contained micro stories.

Interactivity structuring and editing

Students were asked to think about the way to link the short clips taking into account the way they structure a concept map. The focus group session activity was promoted also to allow students to think about how they can organize their content taking others into account. Students drew the concept maps sharing part of its development with the colleague by their side, sharing with each other keywords and links between them. Figure 18 is an example of these maps. Students were also asked to consider the level of difficulty they would have explaining each concept from one to three. The interactivity and the interface design were done using the Korsakow application. The editing main features were addressed in the first week of this project and some interactive projects made with Korsakow were shown as examples. Recommendations concerning the management of files and folders for the project development were also given. Students started using Korsakow in the fourth week with provided archive short clips. In the fifth week they started using their own short clips.

Three participant observation sessions were done with individual students asking them to perform some tasks with the Korsakow application. In these activities the participant students learned some advanced editing techniques in an exploratory way.

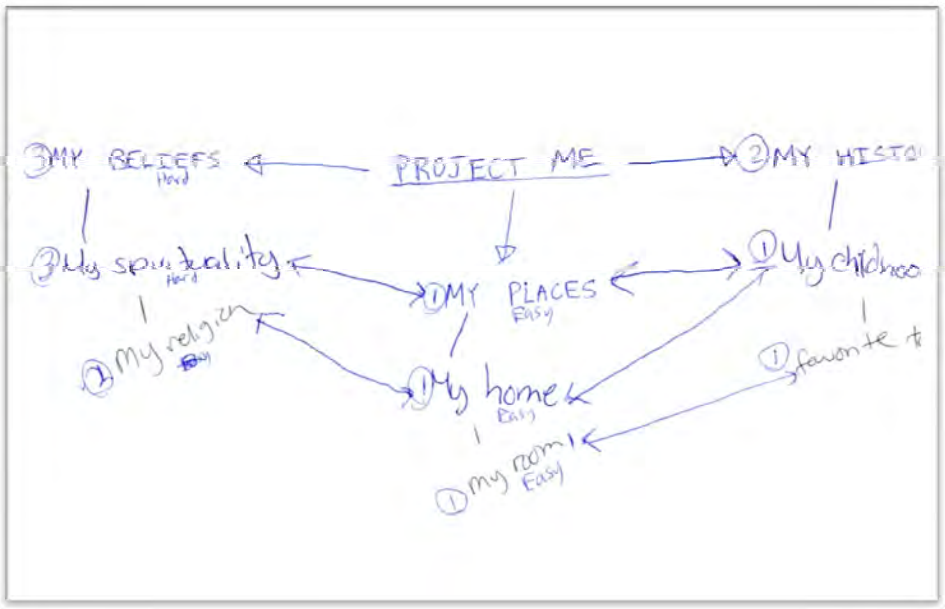


Figure 18 - Map with keywords related to their projects made in the focus group session activity.

Online assignments presentation (Blogs)

Blogs were requested from the first week of classes as personal web pages for publishing the requested assignments and for sharing comments or references concerning class discussed subjects. Students could create them in any available platform (e.g. *WordPress*, *Blogger*). Students had weekly assignments that requested them to post their short clips in their blogs. Most students invested a lot in their blogs and collectively during the eight initial weeks published about 90 pages, more or less one page per week per student. There were almost no public comments on the blogs. The professor commented all assignments providing some feedback and grading to each, however most students would not make them public.

Final presentation and discussion of each other's work

As blogs were not used to post comments on each others' work, the professor promoted in class a peer-based evaluation session regarding all students' final interactive movies. Students saw each movie and wrote their comments in a shared

folder of the class network. This was done in the last week, as most projects were done and available to be viewed in class. Each computer had one movie and students rotated to see and interact with each project.

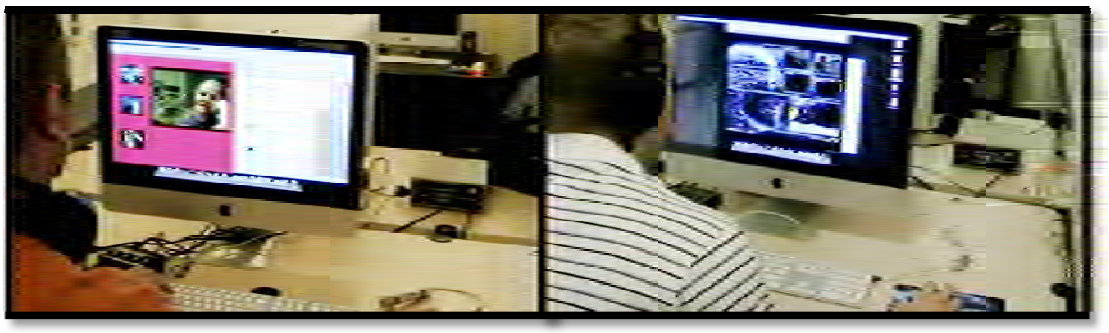


Figure 19 - Students going through their colleagues interactive videos and writing comments in shared files (Videos frames).

Students used preformatted files with the *Six Thinking Hats*[62] approach grid to facilitate different kinds of approach to critiques and suggestions. Students were highly participative. The professor offered extra credits to students if they revised their project taking each other's comments into account. Five students took this opportunity.

> *"Everybody seem pretty motivated and I offered extra credits to them if they revised their projects based on the feedback that they got from people." (Professor, A.2 - PFI, P6)*

4.5. Model's evaluation

As we have seen in the previous chapter, the evaluation of a learning model depends on several criteria. For these projects, the learning model design and its implementation were mainly evaluated taking into account students' satisfaction, learning outcomes and changes in students' attitudes and skills. The description of the

[62] According to "the original de Bono webpage" (http://www.edwdebono.com/debono/biograph.htm), Edward de Bono first proposed it the *Six Thinking Hats* technique. The *Six Thinking Hats*, as described in the Bono Group web page (http://www.debonogroup.com/six_thinking_hats.php), is a technique used in several decisions making or evaluation settings that aims to orient discussion through multiple perspectives. A colored hat identifies each perspective: White hat – focus facts, information and objective issues; Red hat – looks at problems using intuition and focus the emotional reaction associated to it; Black hats – focus the bad things. What does not work or might not work in a project; Yellow hat – focus the god things and presents an optimistic stance considering what is working; Green hat – provides a creative approach of what could be done for a better solution; Blue hat – has the role of practical management of the discussion providing a realistic approach for action.

environment, participants, main activities and the main application performance are key to provide the context in order to have a good perspective over the whole project.

The data collection methods (described in the third chapter) were mainly designed to allow collected data and the researchers' observations to be confronted with students' and professor's own perceptions.

4.5.1. Participants' satisfaction

In the final questionnaire, all students stated that globally, they enjoyed the activity as a whole and in particularly the production of the interactive video (A.8 – FQ, Q14, item 1 and 6). This positive feedback, while giving us the idea that for the students the project activities were a success, does not inform much about what made them satisfactory.

As mentioned in the third chapter, whenever introducing a change in the curriculum or in the teaching methods it is wise to evaluate and try to understand the balance between several important factors. Among these factors are the enjoyment, engagement, the amount of technical support, the time needed for each activity and the level of complexity. When designing and implementing the activities these factors were taken into account and in the research study special attention to those factors was given in observations, interviews, in students' written materials and in the final participants inquires. Overall, the professor was satisfied with the implementation of these project activities in class. In part, she believes that it had a lot to do with luck with the group of students she got, but concerning the adopted model she believes it's quite good and that she would use it the following year[63].

> *"Our classes were really good. I am really happy with the class this semester. It's not always that everybody likes each other. They are friendly to each other." (Professor, A.2 - PFI, P23)*

Enjoyment

The level of enjoyment that students revealed in class contributes to define the level of satisfaction. Most students seemed to be enjoying most of the class-requested

[63] In fact she did use the same model the following year.

activities, as the level of attention and effort seemed high. Most students seemed to have fun while seeing other students' movies and generally made positive comments.

> *"Korsakow taught me that building an interactive project can be both fun and accessible" (Student, A.7 - Blog 2)*

Engagement

The level of engagement of students was high; they were enthusiastic and motivated in all activities. There was an initial idea that promoting a public visibility of assignments with the blogs would favor the enthusiasm of students but that did not seem to happen as most students regarded the blog mostly as an academic work only for the professor to see. Most students were highly participative and classes had a good atmosphere. The professor stated that she was lucky with the class as students were well behaved, collaborative and motivated, but she believes that the main drive for students' engagement was their grades and she would set credits to all requested assignments or tasks. The TA also felt engagement was high throughout the activity and that some students were "really excited to continue with this idea of multilinear story" (A.3 - TAI, TA23).

Level of technical support

Regarding technical support, most students replied in the questionnaire that it was adjusted to their needs (8 out of 11). Although this is considered positive there was one student that did feel the support was not sufficient for him. This was mainly associated with problems related to the use of Korsakow as some problems in exporting the movie were sometimes not detected in an earlier stage and neither the professor nor the TA could do anything rather than suggest to the students to reassemble the project from scratch. This need to reassemble projects happened to most students at different levels of advancement in their projects. For some students that was considered understandable as they knew from the beginning they were using a freeware open-source application. The fact they were not paying for the application resulted in that they were more tolerant. It is also important to notice that the professors and the investigator were not experts in the use of the last version of the application and sometimes they did not have a solution for all the problems or doubts the students had. When this happened, most of the times, the student was advised to

look for it in the online manual as the fastest way to get a proper answer, they generally toke about the same time to find by themselves as the investigator would.

Time and scheduling

Assignment due dates were highly controlled by the professor and students did feel the pressure to deliver their work on time. It seemed there was not much flexibility to discuss or postpone due dates but students seemed to accept that. In the last weeks of work in their projects some students were asked about their opinions about the activities and they replied that they liked them. Nevertheless two of them said they had a lot less time for their project than what they would like to have. The professor believed the activity was highly demanding and that she should not ask for more work than what was already requested. In her opinion students worked to their limits as they had other classes that were demanding. In the questionnaire, six students said the activity was very demanding yet four expressed the opposite opinion (A.8 - FQ - Q14, item 7). The TA thought that most students worked a lot in their projects and that most found they were short on time to do everything they wanted (A.3 - TAI, TA29).

Complexity

For most students thinking and discussing about interactive media was new and it seems they enjoyed it as a refreshing challenge.

> *"While the software itself is relatively easy to understand and use, putting together a multimedia story is extremely challenging, especially for someone who is relatively new to the medium." (Student, A.7 - Blog 5)*

The complexity of the issues discussed was high and many skills had to be combined for students to develop their projects. The balance between what is explained to students and what is left for them to discover on their own, was already identified in chapter three as a key element influencing satisfaction levels. There were some students that easily adapted to the main idea of the project and developed their skills from there.

> *"The keywording was powerful and easy to use to me. It was a concept I grasped easily enough, so I enjoyed playing with them." (Student, A.8 – FQ, Q18)*

But in the beginning most students were puzzled with the application and how

to manage *multilinearity*.

> *"Now that I'm working with Korsakow I must admit I feel really confused and a little bit annoyed by its rules." (A.7 - Blog 8)*

> *"Korsakow really made me realize how utterly complex it can be to craft a good interactive story." (A.7 - Blog 5)*

By the end of the project, most students recognize the activity was challenging, as 9 out of 11 agreed to the statement "The tasks were challenging." in the questionnaire (A.8 – FQ, Q14, item 5). But it seems that for most students, overcoming the difficulties was positive as the struggle lead them to develop ways to adapt and strengthen their thinking strategies.

> *"When a project starts to overwhelm you – draw a mind map. That was the case with the Korsakow project, which was probably the trickiest project I've ever had to plan out." (Student, A.7 - Blog 5)*

Expectations and the novelty effect

Students' expectations were high as they were expecting to produce their own interactive movies and while doing it exploring the state of the art in what concerns new ways for dealing with video and storytelling using the internet. All of these ideas were well expressed in the course syllabus (A.4). These expectations seemed to be at least fulfilled for most of students and in some cases even surpassed. The syllabus refers the specific use of Korsakow as the application for the production of one of the projects. The only student that had heard before about Korsakow had high expectations concerning its use and was satisfied with the application potential and as we can see in one of her final posts also admired with its ease of use.

> *"Considering I have been wanting to work with Korsakow for quite some time but continually putting it off because I assumed it would be really complicated, my overall reaction to completing the project is both relief and inspiration. Relief that it is not quite so difficult as I surmised and inspired for all the possibilities that are there to create further projects with it." (Student, A.7 - Blog 2)*

In the blogs all students recommend the class and some even say they would like more of it (A.7 - Blogs Excerpts). The following post excerpt illustrates the

importance for some students of the addressed themes being so up-to-date.

> *"I would recommend this class because it is all new territory and so there is a lot to learn about and discover about it. This class has changed the way I view media…" (Student, A.7 - Blog 1)*

Students' productivity

All but one student invested a lot in this class. Only one student out of twelve did not finish his project and also did not present his blog. The reasons for not participating much in this course were associated to inevitable personal problems. The rest of the students liked their colleague's movies (10 out of 11) and most of them were satisfied with their own project outcome (7 out of 11) (A.8 – FQ, Q14). The TA also found some works to be very good (A.3 - TAI, TA29, 36).

4.5.2. Learning outcomes

As a mainly hands-on course the previously defined learning outcomes referred to in the syllabus are essentially technical. Most topics make sense in the context of their application in the development of students' hands-on projects. As already mentioned the theme "Myself" allowed a quick start as not much research would be needed and the professor also provided some guidance setting topics to address in six segments: "Being me", "My pet peeves", "Physical me", "This I Believe", "Wishes" and "Someone I admire".

Interactive project's theme

Through the notes taken in class by the investigator, as students posed questions and discussed personal issues with the professor and the TA, it is possible to conclude that some students had to make a real effort to deal with some of the proposed issues. This activity of presenting themselves using video was new for most students. And it seems that for some of the students this introspective activity contributed a lot for self-knowing and for their public presentation of themselves. The level of privacy of some of the blogs' contents shows that some students had concerns about the level of online public exposure they would have. The students' own perception, mirrored in the questionnaires' answers, shows that most students believe

they learned something while developing their movies (A.8 – FQ, Q17, item 2 and 3). For the TA, having a linear authoring tool would probably not make any difference to what students would learn about themselves. But he considers that non-linear editing allowed them to make their project much rich in details. He also considers that students developed their creativity and critical thinking (A.3 – TAI, TA29, 36 and 37).

The adopted model promoted the visualization of several hours of video as students searched for videos online for their projects, also some students have watched tutorials for learning technical editing issues and as they interacted with other students' projects. Most students stated that they have learned both by watching movies online (A.8 – FQ, Q16 - item 3) and by seeing other students' interactive projects (A.8 – FQ, Q14 - item 11).

Multimedia topics

Students' learning was not only consequence of their introspective effort or the amount of videos they have seen. Although there was no specific list of topics in the syllabus to be addressed in this course, in class discussions opened helpful themes for the development of students' projects. The discussions focused these topics:

- Authorship and intellectual property;
- Tacit vs. Explicit Knowledge;
- Video formats;
- Multi-linearity and interactivity;
- Digital media cultural transformation;
- Digital literacy evolution;
- Multimedia Project Management.

These addressed topics were part the professor's objectives for her course but as we will see most of them also required some context of application to be fully understood. Some of these topics were set for students to further develop them in their blogs. Students that used other's materials made reference to the original authors, used materials under Creative Commons (CC) licenses respecting their requirements and some students made clear in their blogs that they were using materials in nonprofit educational works. Authors as Alex Bruns were part of students' readings respecting to

participatory culture evolution (online references and the first chapter of his book "Produsage" was made available for students to read). Already addressed in the first chapter, Bruns (2007) provides a perspective that values user-led and user produced projects for sharing content online. In his first chapter he addresses extensively the shift to *Web 2.0* and sites Tim O'Reilly rules toward opening up the internet:

> *"1. Don't treat software as an artifact, but as a process of engagement with your users. ('The perpetual beta'); 2. Open your data and services for re-use by others, and re-use the data and services of others whenever possible. ('Small pieces loosely joined'); 3. Don't think of applications that reside on either client or server, but build applications that reside in the space between devices. ('Software above the level of a single device')." (p.3)*

One student in his first blog post made reference to the project HITRECORD.ORG, a participatory project particularly associated with media production. In this post as a comment to the first reading proposed in class he showed his interest in *soft copy media*. The term is used as opposed to *hard copy media*, as new form of media that is malleable, interactive, web based allowing new forms of storytelling where the "story can change, the character, the purpose, the original form of media…". In this post the student could link these readings to his increasing interest to learn.

> *"I'd like to become more computers savvy. More experience in dealing with the internet and different programs could never hurt my chances in this economy. It would also be good to become familiar with something that still mystifies me." (A.7 - Blog 4)*

In one class there was a discussion with students about *21st Century skills* following the list of skills proposed by Jenkins at al. (2009) (also addressed in chapter 1). Managing multimedia projects and dealing with video formats was mentioned in the first classes as of great importance for projects success. Having files organized, defining stages and sub-goals to guide their work and choosing the right video formats since the beginning to keep coherence and compatibility in the project. Some students in their initial reading focused on new terms and new perspectives of concepts they already used before and showed interest in exploring different definitions from different authors. One student focused on "interactive digital storytelling" definition,

providing what he understood from what was discussed in class, the Miller's (2004) definition, Miles (2007) approach and his own point o view.

> *"In class, we learnt that when it comes to the text of Interactive Digital Storytelling, an interactive story can be told digitally through the interface of the computer screen, keyboard, joystick etc., which is used by an audience that can manipulate or decide the actions of characters in a digital setting. (…) Overall, I have learnt a new definition of Interactive Digital Storytelling as softvideography, meaning that a user has the drive and possibility to alter a digital film and also has the chance to provide own material." (Student - A.7 - Blog 3)*

The professor and one student agree with Miles when he claims that using Korsakow allows great opportunities to start thinking on new forms of dealing with stories in interactive digital formats.

> *"The Korsakow project was a great way to start thinking about interactive digital stories in terms of video content acting together as a whole" (Student, A.7 - Blog 3)*

In the next topic some of these topics will be further addressed along with attitudes they acquired and skills they developed while working in their projects.

4.5.3. Student's attitudes and skills

One main focus in this research project was the changes in behavior patterns and their acquired competences throughout the learning activities. Most of the skills addressed here were already introduced in the second and third chapter when defining the most important skills for achieving a complete digital literacy. As a hands-on course practical and technical skills were valorized and a varied set of informational literacy skills were developed. Besides video production for interactive projects as a set of skills on their own we will specially address online and networked informational literacy skills associated to the following categories:

- Semantic hypermedia production;
- Internet usage as media provider;
- Networked communication and collaboration.

Video production for interactive projects

As mentioned, students were supposed to be already at ease with *Final Cut Pro* or other video editing application. In the questionnaire five in eleven students recognized their skill level for creating/editing video as *intermediate* and the remaining considered themselves *experts*. However both the professor and the TA indicated that they felt that not all students were skilled video editors. When asked about video editing skill in the first interview the professor replied:

> *"I am not sure. They say they can edit already, and then what I find is that they do know the mechanics of it, but the aesthetical and technical skills they learn in my class." (A.1 - PII, P8)*

In the interview when asked about projects quality the TA considered that most projects reached "high standards" however he believes that he might be biased to a certain extent. Even the projects he liked the most he considered that "technically [in what concerns video quality they] might not have been the best projects" (A.3 – TAI - TA31). Some students that considered themselves intermediate or expert using one application chose to use other application as they wanted to improve their skills with other application.

> *"I wanted to learn more about a program I'd never used. This video project seemed like a good way to learn so I decided to do all my editing in Premier" (Student, A.7 - Blog 4)*

Although the technical quality of the videos was not the professor's main concern there was some effort to help students to make videos the best they could. Some students made a good effort to record new movies and to edit the videos they filmed or others taken from the web. Some less experienced requested more attention from the professor and the TA. The professor was disappointed with some of the students as some of their videos had little or no editing at all. There were some videos in two projects that were just a continuous 30''excerpt from a downloaded video. The ones that took the 30'' challenge more seriously gained more experience as condensing information into a 30'' clip is a difficult exercise. Dealing with different media formats was challenging and required some advanced work in most clips.

"In addition there is so much involving video formats and codecs that I just don't understand." (A.7, Blog 2)

Contrary to professor's judgments most students considered themselves at ease with video editing, and just three felt that they had trouble editing the media they wanted to use (A.8 – FQ, Q16, item 1 and Q17, item 5). Some practical issues that were particularly challenging for most students were:

a. **Managing files for online publishing** – organizing files and folders in logic categories and taking into account restrictions concerning special characters not allowed in online servers (Figure 20 shows professor's recommended organization);
b. **Using online file formats** – understanding and choosing different compression file formats for video, audio and image for online publishing;
c. **Defining video dimensions and aspect ratio** – managing frame size and aspect ratio for each video in order to prevent undesirable shifts in the interactive video interface;
d. **Managing sound** – using media from different origins requires some attention as video sound levels should be properly balanced;
e. **Editing video for interactive projects** – interactive video development requires the ability to edit video in a fast pace to increase users involvement.

But editing video was not the most challenging activity. Most problems and technical issues were associated with programming interactivity and dealing with Korsakow semantic hypermedia.

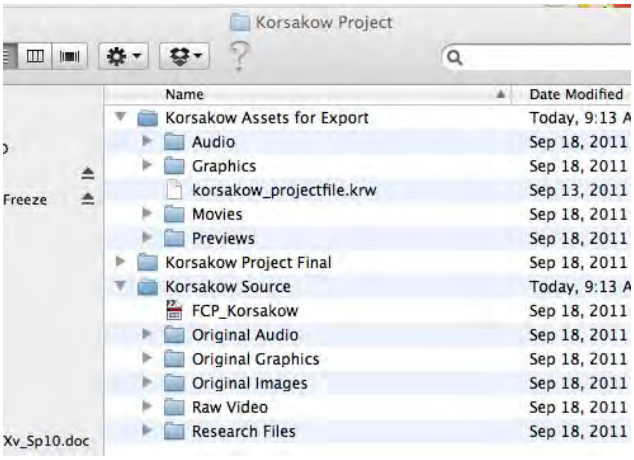


Figure 20 - *Korsakow File Organization Screen Grab* made available by the professor in the LMS for student reference.

Semantic hypermedia production

Multi-linear storytelling

Interactivity in storytelling requires multi-linearity, in other words, it requires the existence of more than one path for the users to follow the story. The professor believed that multi-linearity was new to students and that with the development of this project they "really got a sense of what [it] means" (A.2 - PFI, P2). The TA also mentioned that students started thinking about how a segment of video could relate not to just a single piece of video but to many different ones and "how to make a story with that, not necessarily a cause and effect [story]" (A.3 - TAI, TA23). In his opinion multi-linearity contributed to have more interesting details in each student's project (A.3 - TAI, TA33, 34, 35). Programming interactivity in Korsakow is simplified and technically easy but it requires a practical understanding of multi-linearity. All students understood the concept but it seems there were different levels of understanding as final projects had different levels of structure complexity. Some projects had really simple structures, like wide branch of options from one clip to all the other clips (See figure 21), others had paths with well defined tree structures (See figure 22) but the most interesting ones were those which managed to create the structure taking advantage of a keyword coding strategy (See figure 23 and 24, and the interactive movie in Annex 10 - K-Film example 3).

> *"I chose to create a kind of journey in my project, where people could use a "transit" option to leave a place or continue moving." (Student - A.7, Blog 2)*

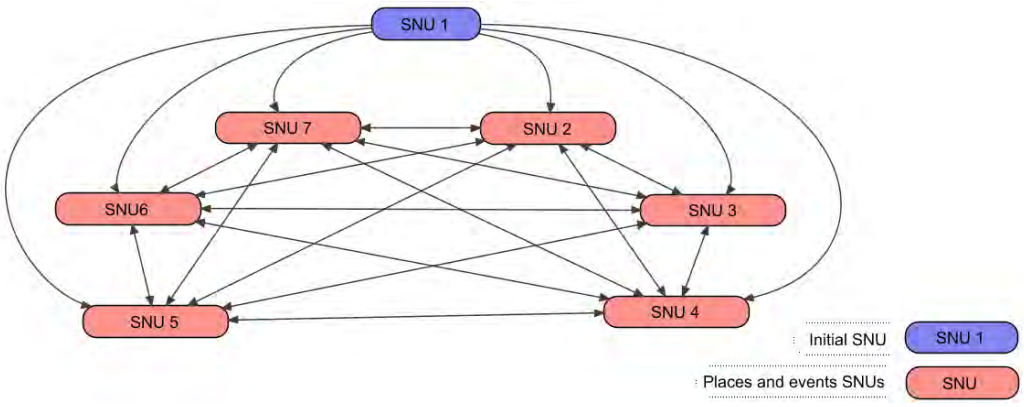


Figure 21 - K-Film example 1 (SNU structure simplified illustration)

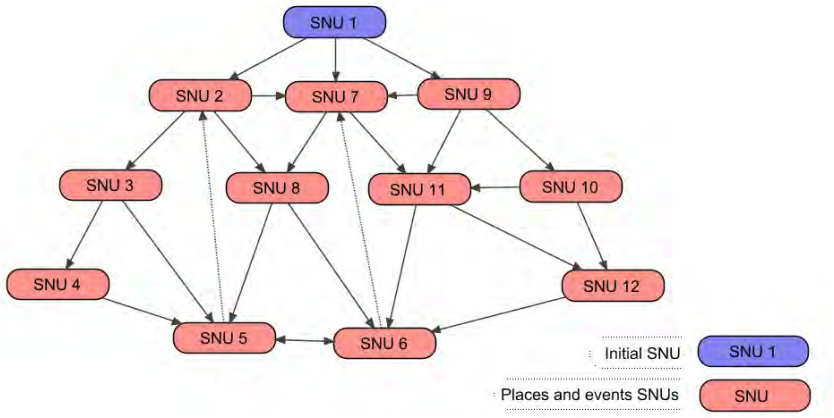


Figure 22 -K-Film example 2 (SNU structure simplified illustration)

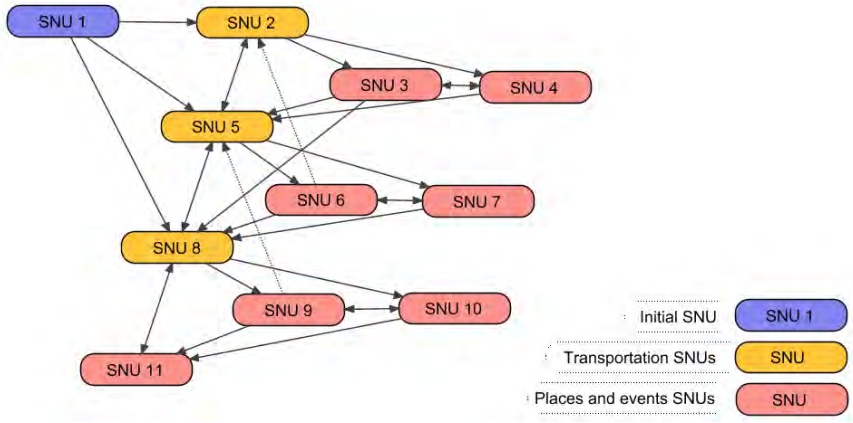


Figure 23 -K-Film example 3 (SNU structure simplified illustration)

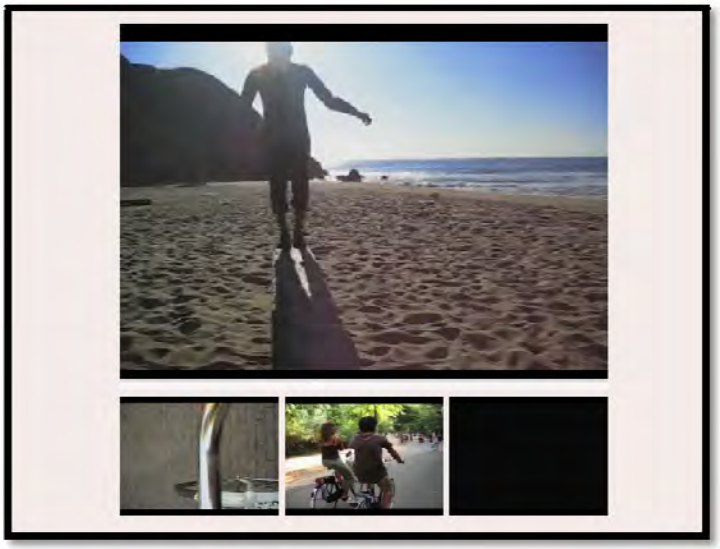


Figure 24 - K-Film example 3 interface (for the interactive movie see annex 10 - K-Film example 3)

Semantic hypermedia coding

As we have seen earlier in chapter 3, what makes Korsakow unique is the way it allows to create keyword-structured interactive videos. However, this created structure or strategy can sometimes be difficult or even impossible to find just by visualizing the film. Generally for understanding what structure a K-Film has, it requires a considerable amount of effort, even for someone already acquainted with the semantic hypermedia logics of the application. In the first classes the professor presented some K-Film examples, but the way they were structured does not seem to have been understood by students. Only after installing and visualizing the coding structure of the tutorial example some students began to understand how it worked and how the example was structured.

> *"I found the exercise in class in which we mapped out our projects (like a web) to be very useful." (Student, A.7 - Blog 5)*

Korsakow facilitates the coding process, as no programming language is needed. However understanding how its semantic hypermedia logic works and how one can define structured strategies, is a hard process. Students only began to understand it while working with the application and different levels of understanding were reached in different phases of the project.

> *"Some of the challenges I experienced were with the key wording and making sure that all my videos were going to be viewed." (Student - A.7 - Blog 6)*

The investigator's perception of these different understanding levels derives from different observations:

- The complexity levels of the K-Film structures (while seeing the K-Films or by looking to the keyword setting in the Korsakow project, e.g. figure 25 presents a screen grab of the editing interface showing a project with a random structure);
- Students' descriptions of their own strategies (in the class and blogs);
- Students' comments made about what they would do different after going through each others' final K-Films (in the class, blog and final questionnaire).

Some students made their project's structures completely random, other were more concerned with trying to control the navigation with rigid keyword linking settings and there were only a few who took advantage of a more loose but still structured strategy. Some for instance defined different categories of keywords to better define their structure. Some used advanced features to balance SNUs visibility, e.g. increasing SNU's appearance probabilities ("SNU rating").

> *"My keywording strategy was somewhat random, but I wanted the videos to appear the same number of times. To achieve this I had to increase the SNU rating for some of the videos which had less keywords and so didn't play as much. I increased the rating for «my UT place» video, the «Kim» video, and «my dislikes» video." (Student, A.7 - Blog 1)*

Figure 25 – Student's project screen grab while editing keywords. The current configuration of keywords reveals a random K-Film structure. For each SNU there is one in-keyword and each SNU has most of the remaining existing keywords. For any SNU being presented in the main media interface, 3 options will be presented, which are chosen randomly from remaining SNUs.

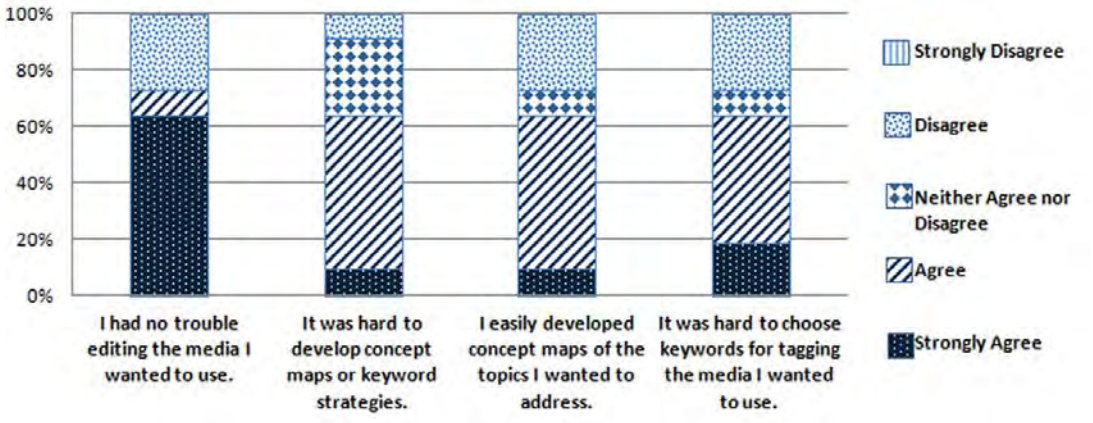
Some students commented after visualizing others' K-Films that if they had understood earlier all the structure possibilities they would have made their K-Film structure different. Developing keyword strategies was considered by most students to

be the most challenging aspect of dealing with semantic hypermedia projects. The graph in table 5 illustrates that, while being easy to edit media or developing concept maps for their topics, choosing keyword strategies or tagging media on their projects was hard. One student explains in his blog that the focus group activity where visual mapping was explored (see Fig.26 with example of exercise result) helped him to succeed in structuring his project:

> *"My rough draft was a mess. Videos weren't formatted correctly. SNU's did not connect in a way I wanted them too. And overall, the project was lacking a sense of narrative coherence. So I decided to simply blow it all up and start from scratch. Only this time, I used an exercise we did in class.* ***I pulled out a piece of paper and made a web, splitting all the videos up into their own respective categories and at the same time, brainstorming keywords that could summarize them****." (A.7 - Blog 5, emphasis added in bold)*

Confirming what was observed in class, after going through each other's K-Films, students say in the questionnaire that they could understand others' project keyword strategies (8 out of 11) (A.8 – FQ, Q14 - item 10).

Table 5 - The graph shows the level of agreement with the following sentences (A.8 – FQ, Q16 - items 1,2, 4 and 5)



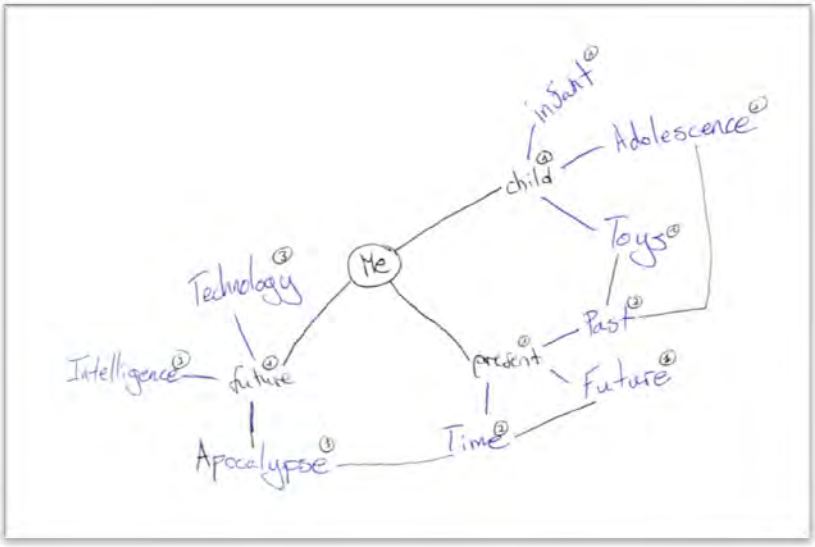


Figure 26 – Map drawn by two students with keywords related to their projects made in the focus group session activity.

Desktop Multitasking

Multitasking was not new for any of the students. It was evident that most students had no trouble in dealing with several devices, applications and window displays at the same time. Even switching attention between professor and the computer was natural to all students.

For any project where interactivity has to be set, there has to be one more level in complexity and one more level of tasks over the creation of a linear project. In most projects using an additional application is required.

When using Korsakow it was recurrent to have at least one other editing software or an online browser active in the desktop. Students switched applications as they would be editing in one while other application would be rendering or exporting movies. Korsakow allows several SNU editing windows to be open at the same time and most students seemed very comfortable taking advantage of this possibility, packing their large displays with multiple windows and editing several SNUs at the same time. This observed practice is also an example of multitasking in the desktop (See in Figures 27 and 28 students editing projects with multiple windows opened).

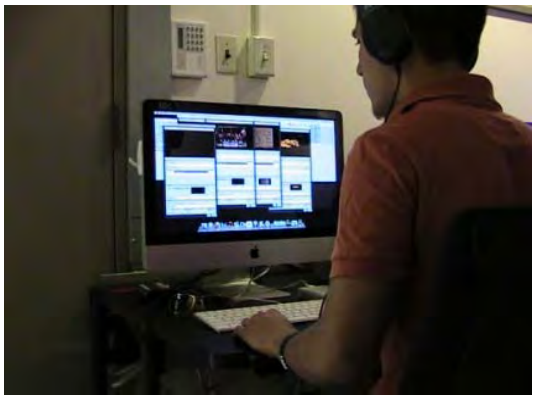


Figure 28 - Student developing his video in Korsakow with multiple SNU editing windows open.

Figure 27 - Student managing files in a folder with several applications open in the foreground (Korsakow, *Final Cut Pro* and *Photoshop*).

Distributed cognition

As we have seen in chapter 3 distributed cognition has to do with the ability to further extend thought and knowledge through the use of software. In this class students relied in Korsakow to help them think about new ways for connecting media. Many students developed their media networks within Korsakow directly as it was for some of them the only tool that could represent or help them evolve the complexity they wanted for their interactive videos.

Exploratory engagement

The capacity to engage in an exploratory endeavor to learn how to perform a task with minimum guidance was observed in most students. The professor presented the basic steps for producing one interactive movie but not all details were addressed. Students were encouraged to explore the application in class and on their own at home. There were different levels of autonomy and engagement in that exploration. Some students did explore the application on their own but most would ask the professors or the researcher for the availability of some features that would work for their projects. Most questions were answered but some “how to do” questions were answered with minimum detail to see how students could do it on their own. Most students considered the Korsakow interface easy or very easy to use but there were three students that considered the adaptation was hard or very hard (A.8 – FQ, Q17 - item 1).

Most students liked this approach and at least two students claimed they like to learn how to use new applications.

The participatory observation proved to be a good method to understand how students deal with this idea of exploring the application. It was done with three students that had just a few hours of exploration of the application. Students invited for the observation session wanted to already have some knowledge of how the application worked before participating in the observation. But all the three students had no trouble in accepting to do the session in the hour or in the following day. All of them were quick dealing with the simple required tasks to create one interactive movie (importing movies, renaming SNUs, editing keywords). Even one student that was not in the class where the application was presented had no problem in the process as he explored by himself the application at home. That student seemed to have an impulse for discovery. Without the investigator request, he tried to change one particular aspect of the interface that was not editable with Korsakow. After a while he found that it was not possible with Korsakov tools and he started exploring the export files of the produced K-Film in order to change the exported style sheet of the project[64]. This student already had some experience in programming HTML and CSS. In this participatory observation two of the tasks were not presented in class and naturally took considerably more time than the others took. Students required tips for resuming one of the tasks but all could achieve the required objectives. Also some students that did not participate in the observation sessions seemed to enjoy this discovery process and stated in their blogs how they felt about it.

> *"I liked exploring the interface and finding out how to set the keywords as a strategy for the user to get a real experience." (A.7 - Blog 3)*

> *"Most softwares can be a pain to pick up and learn in such a limited time, but with the help of the Korsakow website, I was able to understand the software relatively quickly. But then again, most of my learning came from simply playing around with the program itself." (A.7 - Blog 5)*

[64] Style sheet of a project is a file (in Korsakow a CSS file) that has the visual layout used in the pages of several web pages belonging to the same project.

Internet usage as media provider

As already mentioned, students were encouraged to use for their projects online materials. This aspect of the project provided a context to explore in the classroom several issues as:

- Online search strategies;
- Criteria for selecting online sources;
- Copyright law;
- Online fair use policies;
- Intellectual property and creativity;
- Public online exposure.

All students seemed comfortable searching the internet for materials for their projects. They would use diverse video websites (e.g. *YouTube, Vimeo*), diverse sources for pictures (e.g. *Google, Flickr*) or music (e.g. *Jamendo, Melody Loops*[65]). Most students said it was easy to find media they were looking for. In the questionnaire 10 out of 11 students said they did not have a hard time finding media online (A.8 – FQ, Q15 - item 1).

The exploration of the above mentioned issues started in class with the exposition of some concepts and further readings were suggested, however dealing with the issues in concrete situations, provided students with the opportunity to consolidate them, while developing new media literacies. One can read about building one's identity online by most influential authors like Sherry Turkle but building a blog with movies about oneself is certainly a wider experience. Students' exposure was discussed as not all students were willing to openly speak in front of camera about themselves. The professor made clear to everyone that the work should be personal and reveal as much possible but it could be anonym and any solution could be adopted to keep identity disclosed. Students could use friends as narrators or have videos available online only through passwords.

Also knowing how to deal with online content was one of the major challenges.

[65] Melodyloops web page: http://www.melodyloops.com/ ; Jamendo web page http://www.jamendo.com/

Discussing about the creative process and how digital media projects can be part of a growing *remix culture* allowed students to take their own critical stance in what concerns the way they used and made available their productions in a real context.

Appropriation

As already mentioned in chapter 3, *appropriation* is the chosen term to define the capability for responsible use and integration of other's contents in one's own project, in a meaningful way. The professor presented concerns regarding copyright and fair use policy. These concerns are also referred in the course syllabus (A.4 - Course Syllabus).

All students did use archive videos available online, in their projects as at least one short video assignment should be done only with archive footage. Some students used downloaded music for their projects. Students made reference to the sources of their materials in the blog posts and/or opted for royalty-free music. Some expressed in their blogs that their videos were merely academic and no profit would come out of their remixing projects. Also students used materials with some purpose in mind. These materials gained new meaning as the context in which they were used changed. Some materials were remixed within the same clip, others gained their new context simply by being placed somewhere in the macro structure of the interactive film. This new place in the macro structure was set by the tagging and keyword setting of the small segments.

Although tagging may be considered a simple act that most people do with no effort when uploading their media online, it may in fact require considerable effort if dealing with other people's content. This was considered a hard task for most students (7 out of 11) (A.8 – FQ, Q16 - item 5). Choosing the right keywords requires not only comprehension, understanding and synthesis capabilities but also the capability to integrate these materials in their projects. This requires an idea of where and how the resources make sense in the K-Film narrative. The appropriation was done at different levels. The most basic level would be simply cutting segments and tagging, more elaborated segments had several online excerpts, still more elaborate would have one's own materials and different sound track. Another level of appropriation was achieved

by one student that made use of 3D character animation software to create one segment and recorded a video game performance within the game environment and assembling them in *After Effects* to do another one (See figure 29 and 30).

Figure 29 - Frames from a student's segment created in a 3D software application (*Movie Maker* by *Xtranormal*).

Figure 30 - Frames from a student's SNU based in multiplayer game video capture (*Halo* video game).

Collective intelligence

In their projects students mainly searched for help when they could not do something they wanted with the applications they were using. If they were in class they would most of the time start by seeking the professor's help but some other times they tried to seek for help online by themselves. Some students dedicated some time at home to explore Korsakow and dedicated some time to read the Korsakow help pages (tutorials and tips and tricks). Some were happy to pass the knowledge they gained to their peers when they saw they were having trouble. This seemed to benefit both students. The one seeking for help learned the right procedures, while the one helping

could validate his recently acquired knowledge and further explore the application while getting involved in the other's problems.

In the focus group all students stated they had already used *YouTube* to learn specific things ("mostly technical issues") and that they frequently use the internet to learn a great variety of things (from cooking to learn how to use specific software).

> *"Every program I work with, I get tutorials from YouTube… I don't sit down to read anything… YouTube is the best way to get it really fast." (Student in class recording in the focus group session)*

As already mentioned most students replied in the questionnaire that they learned a lot from the videos they have watched online (7 out of 11) (A.8 – FQ, Q16 - item 3). As everyone had to use Korsakow and no one had used it before, when the professors were not available, all needed to rely on each other and in online available content. Also the idea of working with others to develop this kind of projects was pointed out by one student in his blog:

> *"The main take-away from this course is that for most projects you are not able to do by yourself" (A.7 - Blog 2)*

Judgment

Critically judging contents available online was stimulated in this project as students were obliged to choose the materials to use in their project. Comparing students' feedback concerning the critical usage of the internet as information source in the focus group, with the answers given in the questionnaire, allows estimating the evolution of their skills and attitudes.

In the focus group not all the students seemed to be aware of the need to be critical when searching for information online. Nevertheless, some students seemed to know the need of checking and "double checking" information found online. Students also mentioned the importance of checking the content's source as a way of defining the level of trust. One student referred that the level of trust in online resources could be defined as if it was viewed or read in any other traditional media. Some characteristics of the material have to be taken into account: the design appearance; the pictures' quality; the writing style; etc.

One student argued that some online contents are provided by media agencies already established and therefore gain the same level of trust of contents presented in traditional media.

Through the questionnaires' answers it is possible to conclude that students had different levels of trust in different media, e.g. students trusted books more than online contents, but trusted TV less. Several students even stated they believed in most of what they read online. This level of trust seems to be based on their confidence in their capacity of judging their sources liability. However the professor does not believe students are critical enough. She believes that it is a skill not much stimulated in the course curriculum.

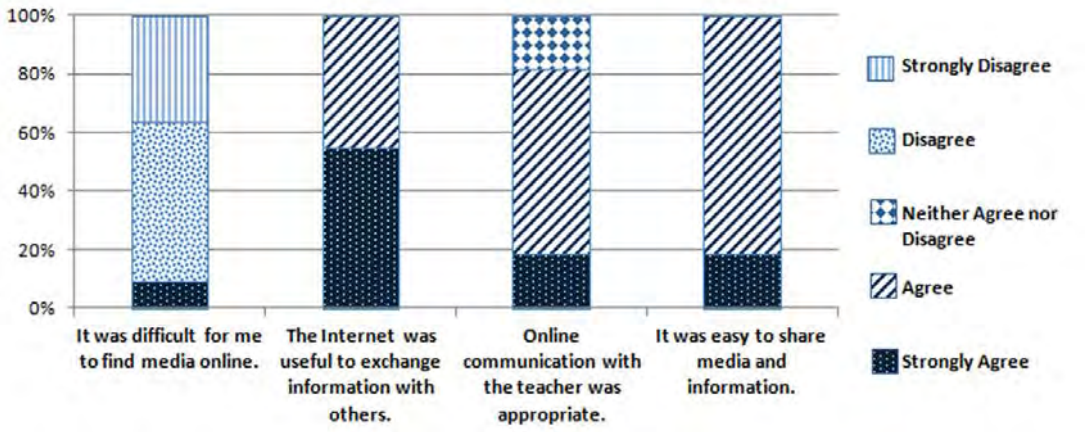
Networked communication and collaboration

In this project several opportunities were provided for students to communicate and collaborate online aiming to the development of networking skills. The professors provided their e-mails to students, and encouraged them to use them for any issues or technical questions. There was also the students' blogs that were initially presented as a place for students, to post their assignments, to share whatever they would find interesting related to the course. Students should also comment each other's posts, but as already mentioned this did not happen. Most students have not even visited each other's blogs and there were no students' comments. To compensate this and still take advantage of computers, another opportunity for sharing and commenting each other's project was proposed. As already mentioned students were asked to use the media lab's network to share their final projects and comment those using shared documents.

Students found that the internet was useful for them to communicate with the teacher and with each other. Most students had no difficulty searching or sharing media and information (See table 6).

The professor also suggested students to contact directly one of the Korsakow developers reporting bugs or other problems with the application but it actually did not happen. Nevertheless students did exchange e-mails with each other and with the professors. Students also access the LMS for resources made available (See fig. 31).

Table 6 - This graph shows students' level of agreement with the following statements: It was difficult for me to find media online; The Internet was useful to exchange information with others; Online communication with the teacher was appropriate; It was easy to share media and information (A.8 – FQ, Q15).



The professor made extensive use of the data show to present online examples or to show how to use applications. The professor also presented web pages with relevant resources for students to use (e.g. the course page in the LMS, see Fig. 31).

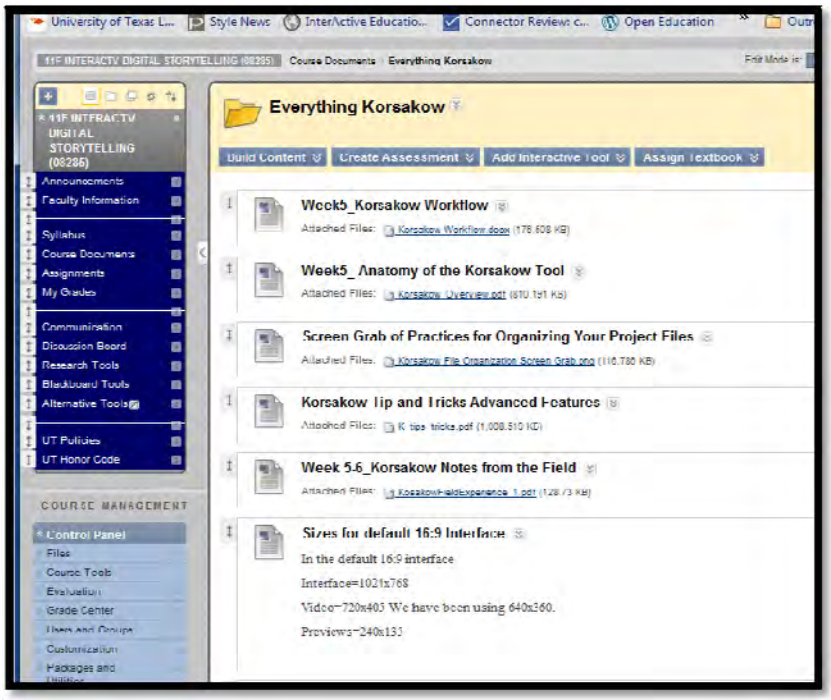


Figure 31 - Class web page in the LMS with several resources for good practices with Korsakow.

Networking

As already mentioned students were also asked to publish most their assignments on their blogs. This demand promoted in students a sense of public exposure and with it another level of responsibility. Online publishing was not new for most students. In the focus groups all had already published online a video, a photo or a written comment before, but most of them would not have a personal blog or were used to publish academic work. Creating and keeping the blog was not a technical problem for students but different levels of accomplishment were attained as to the graphic quality and personalization of the site.

> *"Always look to others for inspiration. This was a lesson I really learned during the last screening. After watching some of the other fabulous projects, I couldn't help but get inspired to do more with my own."(Student - A.7 - Blog 5)*

For the professor the blog was considered to be equivalent to the traditional paper diary that she used to ask students. The main advantage she saw was that it allowed showing animated content. However a blog's visibility can be greater than a simple paper diary that may be shared only with the professor. Through the content analyses, different levels of investment could be seen as some posts would have, besides the video, some written comment that could be very long in some cases. Blogs comments found on the blogs were only from the professor. There were no incentives for students to comment each other's post. Not all the professor's comments were visible as students would prefer to keep some of them for themselves. Most students did not publicize their blogs and only provided the links to a very restricted number of friends or family. Two of them made the posted videos only available to users with password restricting access to any other user. To understand to what extent were students concerned with the webpage visibility two students were asked in the end of the semester if they somehow publicized it and if they cared about the number of visits it had. The two of them were not concerned about how much audience they were having in their blogs and said they had never consulted the access reports.

Networking skills as we have seen in chapter 2, are interpreted as a set of skills that include *appropriation*, *collective intelligence* and *judgment* but one relevant aspect mentioned Jenkins et al. (2009) has to do with the use information from groups

of users. This aspect has to do with the ability to articulate one's opinions and ideas in an independent way within a group, as well as being able to summarize or synthesize other's opinions and ideas. This level of communication that was not possible to do using online tools was developed in the face-to-face setting of the classroom using the class network. Communication and collaboration reached a high level of intensity and quality in the final activity, where students participated in a collective review of each others' final projects. This activity was held in class where each workstation was prepared to screen the final project of each student. Each student was asked to watch each colleague's project and comment it in a shared word document (Annex 5 - Student review example) (Annex 6 - Review model).

> *"The collaborative element of the class was incredible, and it helped us come up with good ideas and mesh well as a group." (Student, A.7, Blog 4)*

There was a good participation in this activity as in average students wrote more than five lines of text for each project. To understand this success six factors were contributing:

- It was an explicit class activity;
- Comments were made using the internal network with no public access;
- The professor prepared the discussion in the previous week focusing project analysis and discussions in a positive oriented way (using the "six thinking hats" approach);
- A template was provided (A.6);
- All students were commenting at the same time;
- Some projects were viewed by more than one student at the same time enabling a previous person-to-person (face-to-face) discussion.

The way the activity was set allowed all students to interact with each other's projects and to provide comments and suggestions. Comments were mostly positive and some were highly constructive, providing ideas for improvements. Students had the idea of making a real contribution to each other's projects as authors had a chance to enhance their project for extra credits until the end of the following week.

Negotiation

Several aspects required a great deal of negotiation as student had to put themselves in the role of their audience. They needed to have into account the user interface and the need to have constant user interest, as users should be engaged not only in viewing contents, but also making decisions on whether they want to continue and what do they want to see next. Students had to deal with:

1. **Interface design** – Korsakow allows the author to customize the final user interface design, while doing this students needed to take into account user experience, usability, navigability, graphical environment and in some cases legibility;
2. **Shared authorship** – interactive video authors need to understand that the final user must have some degree of liberty over the course of their own experience and therefore consider a multi-linear structure with several options.

These two issues and the effort to consider other students' comments for improving their projects stimulated negotiation skills.

> *"I really enjoyed learning about interactive and keywording theory, exploring other interactive projects, working on practical projects and critiquing and being critiqued by class members." (Student - A.7 - Blog 3)*

Some students made great investment developing customized graphical user interface like the one presented in the screen grab in figure 32.

Figure 32 - Student's interactive video final interface.

Tagging videos requires students to think in words or in this case in keywords with significance to others. For instance in the focus group activity when choosing keywords students were asked to think not only in words relevant for themselves but to have into account the broad meaning of the chosen words.

> *"The Korsakow project was very enlightening in that it expanded my appreciation for the effect that the media has on the audience." (Student - A.7- Blog 4)*

> *"Know your audience: As creators, we often get selfish with our projects. We assume that everyone will love it because it's our baby, but the truth is that you need to design and create with audience in mind." (Student - A.7 - Blog 5)*

In the professor final interview she pointed out shared authorship as a key concept for developing multi-linear videos.

> *"They talked about the idea of multi-linearity, that I doubt that it would be a concept that they would be using before. In that sense they can really sense what that means, and they had experiences with it. So that is a new concept for them. The idea of who is the author. The author of the text being a collaboration between the "user" audience and the "creator". That is a thing they started to realize." (Professor, A.2 - PFI, P2).*

4.5.4. Enhancements to the learning model

All learning activity models can be enhanced and the experience of going through this project allowed the professor and students to consider ways to improve the learning activity. The ideas that were discussed in class, in interviews, written in the blogs and in the students' final questionnaire are presented here.

The professor enjoyed how it all worked out and believes she will not make big changes to the activity structures for next year.

Setting the project's theme

The option of defining in advance the theme was the professor's initiative and it seems that it worked well for most students and in fact, there was no time wasted in choosing a theme. This option contributed to certain homogeneity of the projects and allowed students to easily connect to each others' projects.

The selected theme "Myself" is flexible enough for a good level of subjectivity and did seem to engage most students. From the questionnaire's answers, the investigator could conclude that only two students would prefer the opportunity to choose their own theme.

> *"The self-portrait was a good idea that I think would be easy to work with." (Student, A.7 - Blog 7)*

Starting project activity with thematic video assignments

With the main intent to speed up production the professor also defined topics for six videos to be made as complementary assignments to post in the blogs. This relieved students the need to choose topics allowing then to promptly start working on their videos. By the fourth week students already had two 30 second videos to use in their projects. Several students and the professor were very satisfied with this option.

> *"The fact that the video SNUs were short assignments helped a lot. They did not get overwhelmed." (Professor, A.2 - PFI, P12)*

> *"I think structuring the project from small videos we had made over the semester gave each piece great structure to evolve from. I particularly liked the practice of making small videos." (Student, A.8 – FQ, Q18).*

Some other students were not happy with having their work so pre-set. This contributed to some feeling of lack of liberty in at least three students that expressed that in their final comments to the class in their blogs and in the final questionnaire.

> *"Instead of assigning random topics to make videos about, let the student format their own videos and projects based on a singular theme at the very beginning." (A.8 – FQ, Q20).*

> *"…maybe [I would] make the prompts more flexible as to interpretation so that students aren't so limited and their videos can better fit the vision they have for their entire Korsakow project." (A.7 - Blog 7)*

This instructional design also helped to promote homogeneity and some points of connection between all projects. This scheduling of activities delayed by four weeks the presentation of the Korsakow application which made some students a bit

uncomfortable and frustrated when they started to structure their interactive video. Four students suggested in the questionnaire that the whole Korsakow project should be presented earlier in the beginning, so that students could understand the overall idea before starting shooting or editing their videos. As two of them mentioned, their videos of the initial assignments could not fit in their Korsakow projects. In the final suggestions one student said he would like to have "more freedom" in the project and other would rather have chosen his own theme and sticking to it instead of being assigned with several topics for some videos.

> *"I would allow students to come up with their own original Korsakow projects at the onset, instead of making them commit to the personal portrait assignment." (Student - A.7 - Blog 5)*

One other student diverged in this matter stating that she like that not everything was defined in the beginning of the project.

> *"I appreciate that the project was introduced a little bit at a time" (A.7 - Blog 2)*

Technical support

Almost all students classified technical support as adequate (73%). Only one student did not find that technical support was adjusted to his needs (A.8 – FQ, Q14, item 2). Two students wrote in the final questionnaire that they believe they would benefit from additional "one-on-one" professor support. One other student suggested that additionally a wiki could be developed including problems students faced in their project and how they have overcome them (A.8 – FQ, Q20). For this student having more new media solutions would be great. In his view, this would provide students the opportunity to gain more new media skills (e.g. networking and distributed cognition) and not only support students to help each other's but the community of users. The elaboration of this idea revealed that this student enjoyed exploring new media solutions and appreciated the effort to level students' online digital literacies.

Examples analysis and interpretation

One student suggested that they would benefit from the analyses and discussions of "what makes a successful Korsakow [film]". He also suggested that the

openness and variability that the application allows should have been emphasized and explored.

It seems that the professor also had the same feeling expressed by this student as she said that the one small change she considered would be interesting to add, would be to ask students to make a written comment on one of the K-film examples presented in the Korsakow online gallery.

> *"I think I pretty much will do the same thing. I mean I was really happy with the way it worked out. (…) I suggested them to go on the gallery of Korsakow and look at the projects, but [next time], I might make them write about it. Like view a full project and then write about it. To start to think of what are the things that are connecting these SNUs together."(Professor, A.2 - PFI, P32)*

> *"I think it would have been better to analyze, and really discuss what makes a successful Korsakow... and perhaps the various uses for Korsakow." (Student - A.8 – FQ, Q20)*

Students' Project duration

The total duration of this project was set for eight weeks, which was about half the semester. By the end of the project the teacher thought seven weeks would be enough (A.2 - PFI, P14). And in the end of the semester most students (6 out of 9) posted on their blogs that they would also prefer to have less time with the Korsakow project and spend a bit more time with the last activity using *Flash*. This opinion was expressed in a final post required by the professor where they were asked to express their opinion about some aspects of the course and specifically present two things that they would change in the course.

4.6. Summary

This chapter provides a presentation of the project progress from initial analyses, design and development phases to the implementation and evaluation of the proposed teaching-learning model. As expected, analyses, design and development phases allowed adapting the initial teaching-learning model to the course's

characteristics and professor's objectives. Also in these phases the research tools were developed and approved accordingly with the institution's requirements and prepared for implementation.

After a description of the teaching and learning activities the chapter focuses in the evaluation of the teaching-learning model based on collected data. The evaluation focused on several aspects from participants' satisfaction to students' development of attitudes and skills. This was carried out partially during the project allowing some adjustments in the implementation of learning activities. The results were positive and both students and professors were satisfied. There were no significant obstacles to the implementation of the model or the research tools and both research objectives and learning objectives were mostly achieved.

Collected data allowed documenting students' understanding of complex topics, significant skills development and attitudes improvement. The proposed activities and assignments required students to perform several tasks and sets of actions that contributed for the development of initial aimed set of skills. Most of the activities complexity allowed students to challenge their own limits in the areas where some of them already had some proficiency as internet usage to download media or for online communication and in areas where all of them were newcomers as semantic hypermedia production. Table 7 provides a summarizing list of skills and actions developed in each of these areas of expertise. All participants were cooperative and collaborated in the project allowing the investigator to collect all required data and even more than initially previewed. The richness of some students' ideas over their activities, others' activities and learning model reveals meta-learning skills that, as mentioned in earlier chapters, are of great importance for students academic life and onwards.

The project allowed to understand the benefits of several features of the teaching-learning model and showed that the adaptations made in the beginning and along the implementation phase also contributed to support the initially defined set of objectives. One important conclusion related to the whole process is the great importance of including the professor in all the project's phases. In this project all

participants had an important contribution to the success of the project. Not only the involvement in learning and teaching activities were important but also professor's and students' own reflections about their participation, the participation of others and their reflections over the whole process. The sum of all these combined efforts allowed not only the possibility of a good evaluation of the learning outcomes but also collecting more ideas for developments of the used application, the setting of activities and the whole project in itself.

The conclusions resulting from this project inspired changes in the initial model and supported the discussion that led to the development of the next project developed in Lisbon.

Table 7 - Most relevant skills and actions developed are distributed by three main areas of activity

Internet usage as source of media	Online communication and collaboration	Semantic Hypermedia production
• ***Collective intelligence*** - Googling, locating, finding, developing advanced search, annotating • ***Negotiation*** - Comparing, reviewing, debating • ***Appropriation*** - Mixing, re-mixing, categorizing, identifying, naming, selecting, highlighting.	• ***Judgment*** - Questioning content, validating content, interpreting media, inferring • ***Networking*** - Sharing, posting, publishing, tagging, commenting, social bookmarking, subscribing communities.	• **Distributed cognition** - Listing concepts, identifying connections between concepts, planning interactivity • **Storytelling** - Video editing, structuring information, organizing and describing media • **Programming** - Categorizing concepts and keywords, naming media, defining links, deconstructing linear video into multi-linear processes • **Exploratory engagement** - Playing with interfaces, experimenting solutions, hypothesizing results.

Chapter V

5. The Project at University of Lisbon

One month after the end of the UT Austin project the research study continued to implement the basis of the learning model at the Faculdade de Belas-Artes da Universidade de Lisboa (FBAUL, *Faculty of Fine Arts of the University of Lisbon*). This implementation is addressed here as the U Lisbon Project. This project was developed in two editions. In the first edition, the learning activity model has been applied to the courses "Metodologia Projectual Multimédia" (MPM, *Multimedia Project Methodology*) and "Projecto Multimédia I" (PM1, *Multimedia Project I*), that shared the same classes in the first semester of 2011/2012. In the second edition, the same professor decided to adopt the activity model in the following year in the course MPM. These two editions will both be addressed in this chapter as they complement each other in the analysis. The main difference from one year to the next was the number of students that was reduced to almost one third in the second iteration, which allowed most projects to be done individually.

As in the UT Austin project the learning activity model was discussed with the professor several months before the start of the first edition and throughout the implementation of both editions. This chapter will broadly follow the adopted layout for describing the UT Austin Project. The first three sections present the learning environment, the research study participants and the Korsakow's performance and design. The fourth section describes how the activities were developed in the two years. The fifth and sixth sections present the evaluation of the adopted learning model in the first and second editions. The seventh section makes a final synthesis of this project summarizing the work done.

5.1. Courses' learning environment

The courses MPM and PM1, belong to the FBAUL curricular offer for undergraduates. *MPM* is a course for students of the "Arte Multimédia" (AM, *Multimedia Arts*) degree and *PM1* is a course of the "Ciências da Arte e do Património" (CAP, *Heritage and Art Sciences*) degree. Both are hands-on production courses, where students explore multiple techniques and digital applications, to design multimedia projects following different proposed stages, from an initial idea to its implementation. The syllabus specifically mentions the use of *Free/Libre and Open Source Software* (FLOSS) for the development of the projects and the use of blogs and other publishing platforms for assignments to be presented online. In the first edition the two courses were merged together in one big class but not in the second, where the project development with Korsakow was only proposed for students of the MPM course.

5.1.1. The Faculty of Fine Arts of the University of Lisbon

The University of Lisbon (UL, Universidade de Lisboa[66]) is one of the more prestigious universities in Portugal. It is a public university with about 23 000 students and a large campus in the northern part of the city of Lisbon. It is constituted by several faculties that are mostly located in the campus. Nevertheless the FBAUL, where this study was developed, is located far from the main campus in the city historical center. Lisbon is the capital and largest city of Portugal and has a rich cultural offer. The UL and specifically the FBAUL attracts students from all over the country and many foreign students. Most foreign students come from Europe benefiting from exchange programs for periods of several months. Students benefit from a familiar environment as there are about 1700 students distributed by 8 bachelors' degrees and 15 post-graduate degrees. The Design and Multimedia degrees have a big demand and in order to be accepted, students are required to have high average classifications from high school (e.g. 16 and 14 out of 20 for AM and CAP)[67].

[66] In 2013, after the study was developed the UL has gone through a merging process with another university (Instituto Superior Técnico) increasing the number of students and becoming one of the 15 larger universities in Europe.
[67] Information available at Faculdade de Belas-Artes Web page (http://www.fba.ul.pt) and at the official

Figure 33 - Main entrance of the FBAUL.

5.1.2. The Multimedia classroom

The classroom where the study was developed is equipped with a projector, a stereo "hi-fi" system, one TV set and 13 workstations. Computers use the *Windows 7* operating system and have *Premiere, Flash, Photoshop* and several other applications installed. The classroom has also one A4 and one A3 printer, one plotter, an A3 scanner and a white board. The classroom serves several courses and also workshops with external students. The classroom is available from morning to school closing hours with a dedicated technical assistant that is responsible for the classroom when there are no classes.

In the first edition the study was developed in a three hour class with the students of both mentioned courses. In both editions in the last hour of each class, the classroom was shared with an illustration workshop that occupied some of the class tables. The classroom was extended online with the use of a collective blog (using *WordPress*) with all students enrolled as "authors". In this blog the professor published the course syllabus, the calendar, the main references used in class and a list of important events and notifications. She also used the blog to make reminders of due dates for the assignments and to make some comments to students' posts, however she indicated that she would keep most comments and questions to address in class.

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site from Direcção-Geral do Ensino Superior (http://www.acessoensinosuperior.pt/indest.asp)

Figure 35 - Multimedia classroom.

Figure 34 - Workstation.

5.2. The research study participants

In this research study, the participants were 59 students, the professor and a technical assistant. The investigator already knew the professor as they shared PhD classes two years earlier and one workshop on using Korsakow. Specifically related to this research study, professor and investigator met some months before to discuss the possibility of developing it in the following semester and twice a few weeks before the start of the semester making some final adjustments to the teaching and learning activities. The research studies in both years were set to start only in the last weeks of the semester. In 2011 it started in the 11th week and in 2012 in the 9th week of classes. In the two editions students were already very at ease with the professor and the class environment was casual. In both editions the teacher presented the investigator introducing him briefly and asking him to make a brief presentation about the research study and a short introduction to interactive narratives and Korsakow. In both editions the investigator presented the study objectives and explained what would be asked of them if they agreed to participate. He made clear he was available for any doubts about the study and that students were free to not participate at any time if they wished. During the presentations all students of both years agreed to participate. The presentations went on showing some interactive video examples, notions about interactive storytelling and database movies. These presentations will be further addressed in section 5.4, “Teaching and learning activities”.

5.2.1. The professor

The professor involved in this project has about nine years of experience as professor and most courses were hands-on and related to design project and multimedia production. The previous three years she did not teach as she was given sabbatical leave to pursuit a research study for her PhD. In the start of her career she worked as a designer and recently shifted her work toward multimedia art and research, developing in the last year several exhibitions with live camera recordings, body and object oriented interactivity. She has experience with several multimedia tools like *Dreamweaver* and programming solutions such as *Arduino*[68] and *Processing*[69]. She used Korsakow in a workshop with one of the programmers of the application in the previous year but had never used it in her classes before the first edition of this study. The professor was very cooperative and always available to help the investigator in any issue related to the project. She was interviewed in the beginning of the first research study and in the end of both studies. In these interviews she expressed some of her ideas concerning the use of technologies in class and its influence in the change of the professors' role. She believes that students can learn a lot through the use of the internet and she sees herself and the professor's role more as an advisor or tutor rather than the "owner" of knowledge. She believes that a professor teaching technologies in class should be technically skilled to certain amount, but she does not feel that he needs to be a "real expert". She made clear some main objectives as a professor stating that she values in her classes the capability of defining a main concept for one's project, researching sources about it, structuring contents, choosing the right technologies to explore them and being able to understand and define a non-linear structure to support it. She was confident that students can pretty much learn to use the application by themselves but that the professor should be there to guide their explorations. In her courses she also values the support of creativity, the capability of solving problems and critical thinking. With this in mind she brings "hot topics" to

[68] Arduino - Open-source electronics prototyping platform for creating interactive objects or environments (http://www.arduino.cc/).
[69] Processing - Programming language and environment for developing image and sound interactive solutions (http://www.processing.org/).

promote debate and discussion. When asked about how she generally creates projects, she said that:

> *"Mainly I propose challenges. Challenges are like hot topics or topics that might be explored in a controversial way. One of the last proposed topics was set after the movie 'An Inconvenient truth'. Students created proposals related to climate change. (…) about one third of the proposals were related to the subversive part of that project. That was to a certain extent supported as students were incited to question themselves and to research." (A.12 - PII2011, P10)*

Figure 36 – Final interview with the professor (Video frames).

Although used to publish and to use blogs for other activities, she adopted a blog for the first time in 2011 to manage this course and she believes it is a much simpler way to communicate with students than traditional e-mail.

In what concerns editing applications she believes it is important to allow students to choose what they feel is best for their projects and therefore she likes to present more than one technology for the same purpose. She generally proposes at least one open-source application as alternative to other proprietary software for each activity, as she is a supporter of open-source initiatives[70].

5.2.2. The technical assistant

The technical assistant of the classroom was present in most of the classes at

[70] In both years of the project she mentioned in class several open-source and free software and provided the links in the references of the blogs for the class (e.g. LibreOffice - http://www.libreoffice.org; HandBrake - http://handbrake.fr; VUE Visual Understanding Environment - http://vue.tufts.edu ; Openframeworks - http://www.openframeworks.cc/; Processing; Arduino)

least in the first hours of each class. He did not participate in class activities and only dealt with technical issues related to the general equipment operation or with some OS (Operating System) bug or crash in workstations. For most problems or doubts with applications students preferred to ask directly the professor. His presence was barely noticed most of the time and interaction with students or the professor was very scarce. Nevertheless he was friendly and was available for helping the investigator in the research. There was a very informal interview where the investigator made some questions to understand more precisely his role and the level of interaction with students of these courses.

5.2.3. The students

The majority of the students of both editions was in their second year of classes and enrolled in the *Art and Multimedia* degree. By the analysis of the questionnaires no significant distinguishing pattern can be established between students from the first edition (2011) and those from the second edition (2012). The focus groups sessions contributed to understand that differences between students were much more relevant than distinctions as a group (classes as a whole). In the first year three focus group sessions were made, in the second year only one group was made. In both editions, students were participative and engaged. For the research project the main contributions of these sessions were to identify students' enthusiasm with the internet as a learning environment and to verify their knowledge and online experience as active online participants. As we have seen in UT Austin it was also a good opportunity to share some ideas about new media. Conclusions can be very similar for all of the sessions:

- Students said they learn a lot from *YouTube*. Most students referred to computer and technical issues (e.g. Learning how to manage operative systems, learning how to use applications) but also some day to day activities (e.g. learning to play piano; learning how to makeup, etc.);
- Students feel they learn while playing games (e.g. Managing their money, develop military strategies, read, write and speak English, team work

management, history, etc);

- Most students were already acquainted with online publishing and were aware of different types of information structuring strategies;
- Most students were not aware of the concept *semantic web* or *web 3.0*;
- Enthusiasm with games was great in two sessions. Several students in these two sessions (one in 2011 and the other in 2012) stated that they learned a lot with a great variety of video games (one group mentioned eight games and the other ten[71]).

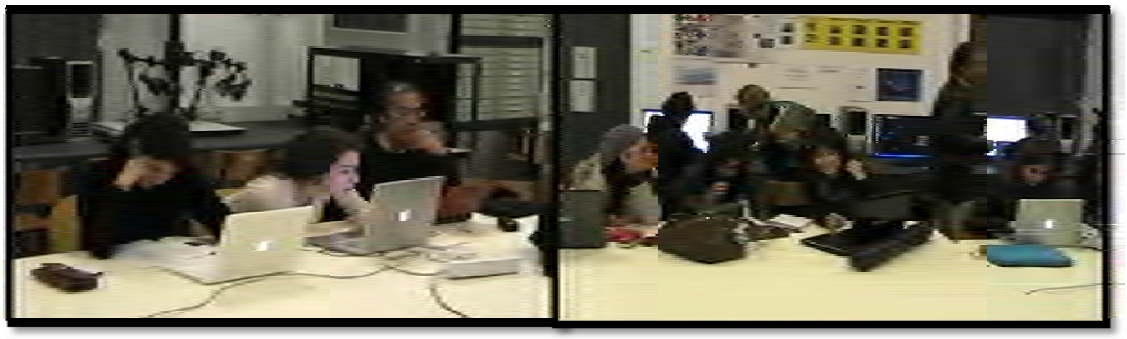


Figure 37 - Students with their own laptops in class.

All students that replied to the questionnaire said they would be online for more than one hour a day and as will be further shown, there is no significant difference in media habits and know-how as a group (A.14 - IQ12, Q7). Even so the two classes will be further described in separate to provide closer detail on other relevant aspects.

Students in 2011

In this first edition there were 43 students enrolled in the two courses. Not all the students attended classes regularly, so it was difficult to keep a track of all of them and their works. For example the focus group session was made in one day where there were only 25 students in class. All of them participated in one of the three sessions that were done. By the end of the year only 39 out of 43 students participated

[71] Games examples: *Civilization, Rise of Nations, Age of Empires, Sims 2 , SimCity, War of Warckraft, StickMan, Call of Duty, Prince of Persia, Lord of Ultima, Counter Strike* and *Travian.*

in their group projects finishing the course with success.

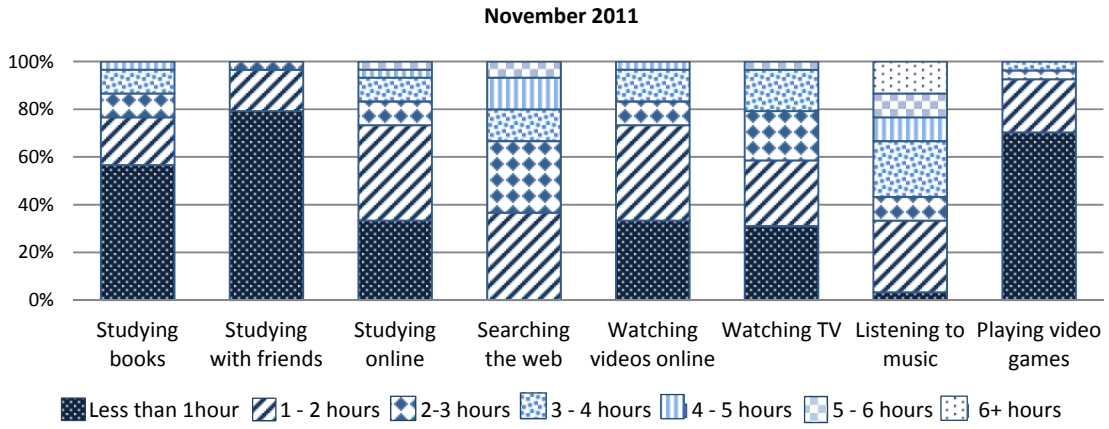
Three students were invited to participate in the participant observation session with Korsakow. The initial diagnostic questionnaire and the final one were answered respectively by 30 and 22 students. Students' age range was large. From the initial questionnaire replies one can understand that only about half the class (16 students) was aged between 18 and 20. About half of the remaining students (7) were aged between 21 and 23, 4 were between 24 and 32, and 3 were more than 33. Ten were men and twenty were female and all were Portuguese (A.13 - IQ_2011, Q1 and 2).

Taking into account the questionnaires' answers and observation in class, in this group, the distribution of students' technology access may be considered heterogeneous as students' answers reveal that:

- Nearly half the students don't have video recording devices;
- One fifth would not have video functionality on their cell phones;
- Two students do not have a laptop;
- One student does has neither a laptop nor a desktop computer.

In regard to studying habits, one interesting result is that two thirds of the students say they study online more than one hour a day versus more than 50% saying they study less than one hour by books or in group (See table 8). Being online seems the second activity where students spend more time only surpassed by listening to music. It is also interesting to notice that the number of students that dedicate less than one hour a day to watching online videos and watching TV is almost the same. And overall the number of hours dedicated to online video is not far behind the number of hours dedicated to watching TV.

Table 8 - Graph presenting the intervals of hours students dedicate to the activities in the initial questionnaire[72] (A.13 - IQ_2011 – P.8)



Almost one third of the class assumed to play video games for more than one hour a day on average. Nevertheless the majority said that they would play computer games less than one hour a day and more than one third said that they never played games online (A.13 – IQ_2011, Q11 – 6).

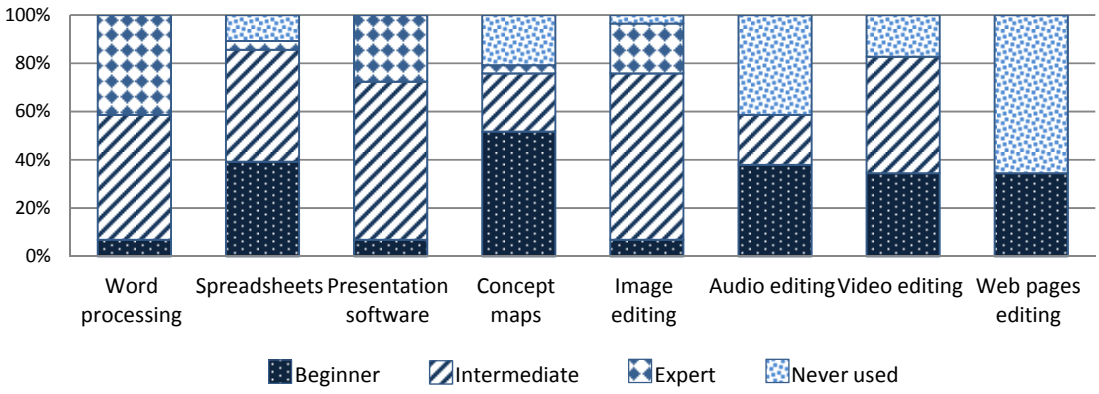
Figure 38 - Focus group session (Video frame).

As we can see in table 9, the editing experience with video, audio or interactivity editing applications was limited, as less than 50% said they never used any application for those purposes or were in a *beginner* level. Only applications for editing text, presentations and image were considered by most to have *intermediate* or *expert* level. It is also relevant that about two thirds of the students said they did not have experience with web design applications. These results are also supported by the

[72] All table in this chapter were translated. To see the original questions in Portuguese see the annexes.

answer to an initial exercise proposed by the teacher where students wrote which applications they already used. Some differences exist in the replies, which is understandable taking into consideration the time-lapse between the beginning of the semester, where students made the maps with the professor mentioning applications they used, and the beginning of this study when initial questionnaires were proposed (10 weeks).

Table 9 - Graph showing how skilled students consider themselves (A.13 - IQ_2011, Q.9).

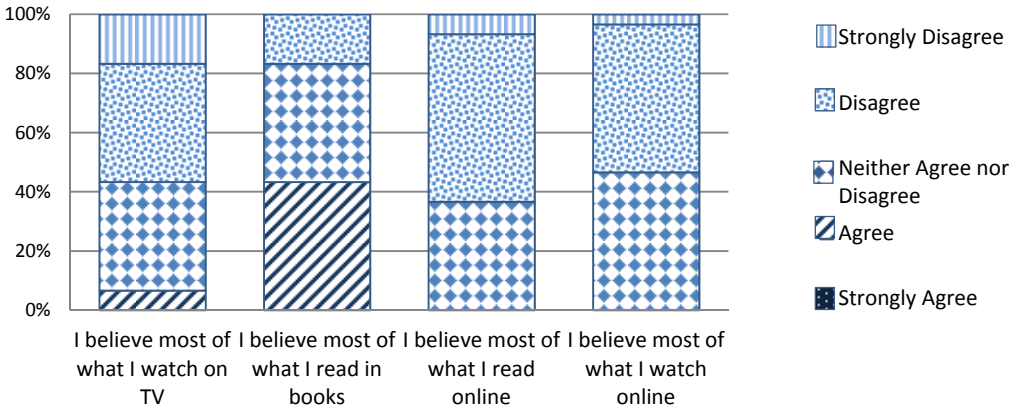


As will be addressed in more detail further ahead in this chapter (*5.5.1 – Participants' Satisfaction*), students were motivated to learn how to use applications as the great majority wrote comments and names of applications they would like to learn or expect to use in the course's initial concept maps exercise proposed by the professor[73].

Most students believe that the use of technologies in class further motivates and improves their learning (23 and 25 out of 30) (A.13 – IQ_2011, Q11 – item 1 and 2). There were only three students that said they don't like to use computers in class and only two of them said they believe computers in class affect their concentration (A.13 – IQ_2011, Q11 – item 5 and 3). Analyzing the answers to the question proposed to evaluate students' confidence in media, it is possible to conclude that most media have a low credibility with the students and especially TV and online video (see table 10).

[73] This exercise proposed to students in the first day of classes, consisted in writing in a sheet of paper their expectations towards the course, their application background use and their objectives (a summary of Initial Map Analysis is presented in Annex 21).

Table 10 – Level of agreement with the sentences (A.13 – IQ11, Q11, item 7 - 10).



Most students seem to diversify their online activities accessing several times a day search engines, video platforms, e-mail and social network sites. All of these activities were assumed to be done on a daily basis or several times a day by a great majority of students. Also messaging on the cell phone or smart phone was one of the most frequent activities (A.13 – IQ11, Q11).

Students' blog usage habits were high. Only one student did not read or access blogs. Twelve students would follow some blog or online discussion in a weekly basis and it is noticeable that more than two thirds would participate with some regularity in blogs posting or leaving comments (A.13 – IQ11, Q11 – items 8 and 12). This is probably due to the activities already done in the beginning of the semester that required publishing some works in the class blog.

Students in 2012

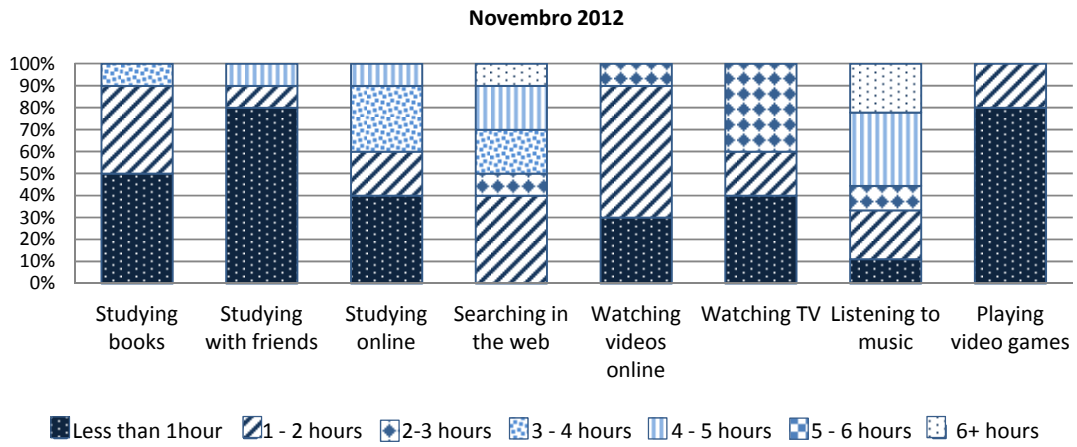
In the second year, the class was smaller with 16 students enrolled. Of these 16 students only 13 attended most classes and got to the end of their projects. Most students enrolled were in their second year of the *Art and Multimedia* degree. There were only four students that were not following this degree. One enrolled in the *Heritage and Arts Science* degree, doing this class as optional, two students from the ERASMUS program coming from Serbia and one student from Brazil, in her first semester of an international fellowship. One of the students from *CAP* was from Cape

Verde and came to Portugal to graduate. Eleven students were under 23 years old and there were only two students with ages between 24 and 32 (A.14 - IQ12, Q1). There were five men and eight women. Students were participative and most were happy to cooperate with the investigator. Ten replied to the initial questionnaire and nine to the final one.

The eight students from AM had already had a semester in a *Digital Media* class with the same professor and were acquainted with the use of some digital tools, networking "to some extent" (e.g. blogging) and with the map drawing activities.

Most students seemed to have good access to technology and only one of them replying to the initial questionnaire said that he did not have any video recording devices or cell phones with video recording capabilities. The girl from Cape Verde also presented herself in several occasions as not being good with technologies. All students say they have access to the internet where they live, but (as in the previous year) there was one student that says he does have neither a laptop nor a desktop at home.

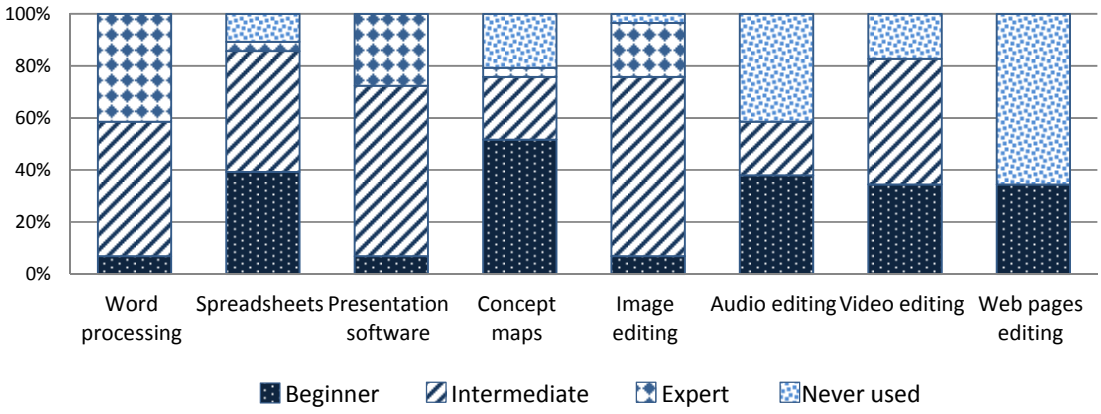
Table 11 - Graph presenting the intervals of hours students dedicate to the activities. Retrieved from the initial questionnaire (A.14 - IQ12, Q8).



The two classes' results in the questions regarding studying and media consumption habits are very similar. As in last year half the students say they study through books less than one hour a day and about 80% study with friends and about

60% say they study online for more than one hour a day (see table 11). Also comparing table 9 with 12, one can see very similar results in the level of confidence and experience with editing tools. The main difference will be in video editing and webpage editing. While all students of 2012 have some experience with video and two say they don't have experience in webpage editing, in the year of 2011 the result was the opposite (all students have edited video and only two students never edited a webpage). Most students believe that the use of technologies in class further motivates and improves their learning (8 out of 10) (A.14 – IQ12, Q10 – item 1 and 2). Most students (90%) said they like using computers in class (A.14 – IQ12, Q11, item 3).

Table 1212 - Graph showing how skilled students consider themselves (A.14 - IQ12, Q.9).



Regarding media confidence (as in the previous year), students have a low level of confidence in TV and in online content being it video or text. For this group of students, books seem to be the most reliable source of information. Even so only five out of 10 said they believe most of what they read in books (A.14 – IQ12 – Q10 – item 7). In this class students also seem to diversify their online activities accessing several times a day search engines, video platforms, e-mail and social network sites. All of these activities were considered to be done in a daily basis, or several times a day by almost every student. Also messaging on the cell phone (or smart phone) was one of the most frequent activities (A.14 – IQ12, Q10 - item 14). In what concerns blogs or forums, the students replying to the initial questionnaire this year are more engaged in

writing than students from the previous year. The majority (7 out of 9) reads and participates in blogs regularly (A.14 – IQ12, Q10 – item 10 and 11). A notable difference was registered in the number of *Twitter* users that tripled in proportion (6 out of 10, instead of a proportion of 6 out of 30 in 2011)(A.14 – IQ12, Q10, item16).

In this edition there were three students that did not use the Korsakow as it was not mandatory. They were also observed in class and one of them replied to the final questionnaire. In the *likert scale* questions about Korsakow his answers were not considered. As their projects' interactivity had nothing to do with semantic hypermedia their projects were not followed in depth for this study. Two of these students were the ERASMUS students that worked as a group and their project had its interactivity setting depending only in live body tracking using other completely different applications (*Quartz Composer* and *Modul8*[74]). The other student that opted for not using Korsakow, programmed his own interface using HTML5, CSS3 and JavaScript[75]. His interactive project had a very simple hyperlink structure. These students were present when Korsakow was presented but they were already focused in specific objectives and software solutions. Their projects evolution was presented in the blog and their final results can be seen as terms of comparison with other projects. For instance their posts show that content structure was not much relevant for their projects.

5.3. Korsakow's performance, design and development

One of the reasons for the teacher to support this project in her course had to do with the fact that Korsakow is an open-source application. As already mentioned the professor is a supporter of the use of FLOSS in media courses. As in UT Austin, using

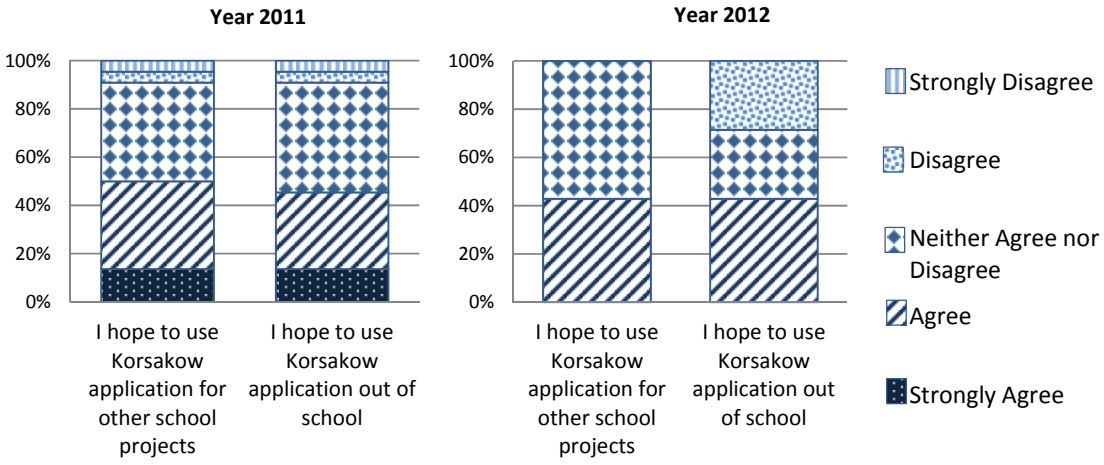
[74]Quartz Composer - node-based visual programming language ("Quartz_Composer", n.d.); Modul8 – Application for real time video mixing and composing (http://www.modul8.ch/)

[75] HTML5 stands for the fifth revision of Hypertext Markup Language that is the standard markup language used to create web pages with recent multimedia features. CCS3 is an extension of the standard Cascading Style Sheet. It is a language used in separated files for describing the looks and formatting of other files presented in html in a webpage. JavaScript is a dynamic computer programming language that allows faster interactivity with the user allowing for instance immediate control of variables in simulations, in games or mobile applications (http://en.wikipedia.org/wiki/JavaScript; http://en.wikipedia.org/wiki/JavaScript).

an open-source application was also a positive factor for all students that appreciated this characteristic. In U Lisbon, before presenting Korsakow to students the teacher presented several other open-source applications that the students could use in their projects[76]. The professor is a strong supporter of its use whenever possible and whenever there is no specific reason to adopt the paid software.

In the first year there were a majority of students saying that they adapted well to the application (64%) but in the second year the result was reversed as 57% said they did not adapt easily. Even so all students did learn how to use it, although not all supported the idea that they would like to use it again. As it can be observed in the tables below (see table 13) only half the students (approximately) would like to use it again in school or in other projects. One of the students that disagreed with the sentence "I hope to use Korsakow out of school" in the final class feedback changed his mind probably because he was less frustrated with last exporting attempts and he understood that he probably had more bad luck with bugs than the rest of the students and that the application will probably evolve to more stable versions with less bugs.

Table 13 - Level of agreement with the sentences concerning the students experience with Korsakow (A.14 and A.19, Q17)



The participant observation sessions were also the privileged situations to

[76] *Vue*, *Wordpress*, *Inkscape* (http://inkscape.org/pt/) and *Gimp* (http://www.gimp.org/).

follow students' explorations of the application. The next topic will address some conclusion regarding interface issues detected in these observations.

5.3.1. Interface issues

Minor changes were made in the interface from version 5.0.5.3 to 5.0.6, used in 2012, and the benefits to usability seemed to be noticed only in the reduced number of widgets in the "Interface editor". Most other changes do not seem to make a significant contribution to improve some usability issues. Some issues are still unresolved and new issues were found:

Drag and drop fixed links – One interface change from the previous version was associated with fixed link previews. The reduced number of widgets simplified the looks of the "Interface editor" interface, taking out the ***fixed links widget*** from the widget box. This made the option virtually impossible to find out. One student that wanted to follow the idea of a project developed in the 2011 class got really unhappy as he was not able to understand how to do them. He took some time to find how-to in the online manual but the version he was using was not working properly. This problem was reported to the software developers and they recommended installing the last beta version for it to run. The whole process was considered by the student time consuming and contributed for the student disappointment with the application.

Setting time for Previews to show up – In the U Lisbon project this was also reported as a difficult task for most students observed but it was a feature welcomed by some of them that used it in their projects. There were two students that tried for two and three times before getting it and were even searching in the interface editing window for the possibility of assigning time in the properties of the Previews thumbnails.

What you see is what you get – At least one student in each year tried to use titles and both found it very frustrating that they could not see in the interface editor how the titles were going to look like. The students had to export the

project each time they wanted to see how it looked like. Some students ended up creating images instead of text for the title because they could not get the text to be the way they wanted.

"SNU Editor" hidden options – There were some changes in the interface of the "SNU Editor" window for the last version used in 2012/2013 but even so finding how to deal with the Preview options was not easy for the students that wanted to customize it. And in terms of usability having to click in the small arrow in the right is not practical. When the Preview options are visible the "Settings" options are inaccessible so one has to click the arrow all the time (Windows OS users).

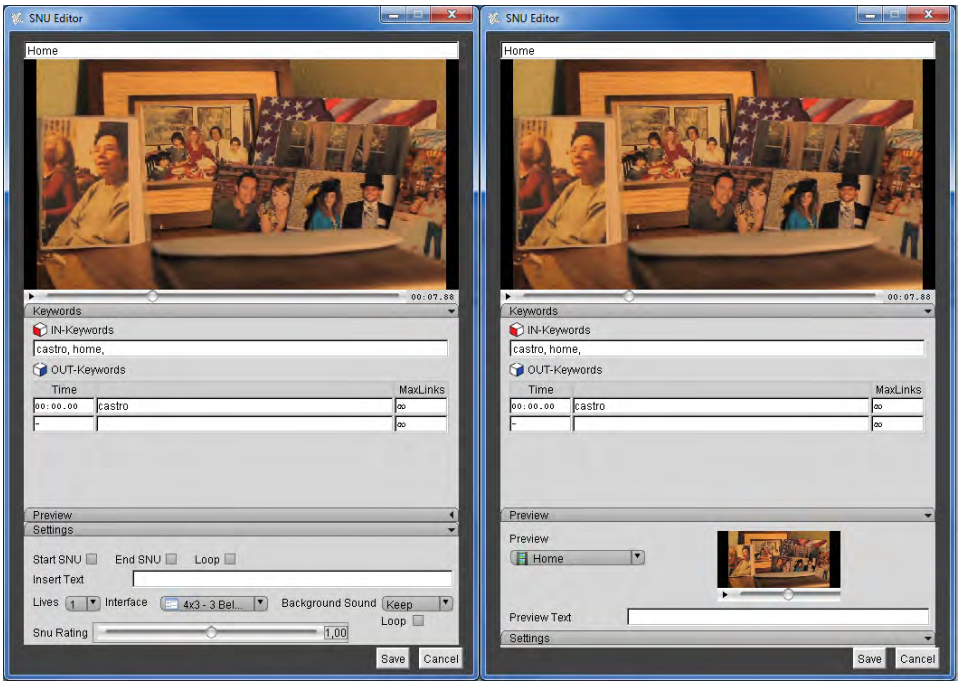


Figure 39 - "SNU Editor" window. On the left Preview options are hidden. On the right showing the "Settings" options are inaccessible.

5.3.2 Bugs and other problems

Definitely exporting the project was the biggest problem for most students. Most showed their frustration as they had to remake projects from scratch because of video formats. In the second year the professor made quite clear the video format

limitations and even posted on the blog about the issue to warn students. But even so there were at least two students that were "forced" to remake their projects. There was a bug reported about the drag and drop fixed links developed for the version 5.0.6. explained above.

In the final interview from 2011, the professor claimed that the online community of Korsakow was not much active in what concerns sharing details or documenting and describing bugs. She also found the FAQ could be much developed (A.16 - P32).

5.3.2. Further developments

In U Lisbon project there were several students making suggestions already made by the UT Austin project's students. In their opinion Korsakow should also allow ***higher video resolutions***, as well as ***different video codecs.*** Students also made the suggestion for a better ***tutorial example*** to illustrate the application potentials. Besides these developments there were two new suggestions:

> **More sound control** – One student suggested that the application should have some sort of sound editing feature to allow the balance of the sound levels.
>
> **Online project sharing** – Working in groups with Korsakow was not easy. If two students wanted to work in a project at the same time in different computers it would be impossible to merge their work together. There was at least one situation in which one student had to remake all her weekend work in the group Korsakow project file, and several students reported this limitation. The teacher also pointed out that online collaboration features would be great developments in the application (A.18 - PFI12, P21).

Most students liked to use Korsakow and this was possible to conclude out of oral and written comments but, as shown in table 13, only a minority of 3 out of 7 said that they would like to use the application again (A.14 and A.19 – Q6) in other academic or personal works. This result in the questionnaire was unexpected and the

investigator opted to propose some questions to one of the students where this contradiction was clearer. The student in question replied that he really liked the project and the results he did achieve stating that it was his best project ever. He had recognized the value of Korsakow before but he was too unhappy with the technical issues he faced stating that if there would be in the future a much more stable version he would reconsider.

The following topics will focus on the results and analysis of the first year (2011) and after then the results and analyses of the second year (2012) further exposing some main divergences and different results that were registered and felt by both the professor and students.

5.4. Teaching and learning activities

Teaching and learning activities in U Lisbon project were not set precisely in the same way as in UT Austin for several reasons. As mentioned in the third chapter the learning model was not created to be imposed and self contained in an abstract context but rather to be adapted and adjusted to the existing conditions.

One considerable difference that mainly resulted from the number of students enrolled in the first edition encouraged the teacher to define for this edition that projects should be developed in groups. One other considerable difference is that the teaching and learning activities focused in this research study were part of a project developed by students during the whole semester. As a course for students in an art degree the professor allocated a considerable amount of time for students to develop ideas and gather their artistic and technical references before starting the effective production stages of their projects. For the creative process students had much liberty for defining their own setting of objectives, tasks management and even decide to what stage to follow their projects (initial prototyping, final prototype, installation, performance, etc.). The main restraint was that all projects would have to present a final interactive video. This interactive video could be the final result of the project, a final prototype, a representation of part of the project or even the making-of of the

project. In the first year this interactive video should be made with Korsakow but in the second year students were also free to choose any other technology to make the interactive video as long as it could be published online.

Activities in U Lisbon project, both 2011 and 2012, were set mostly the same way however as there were fewer students in 2012, students could do their projects individually.

5.4.1. Model's implementation

In the U Lisbon project, previous discussions with the professor helped to define clearly the calendar for the final weeks of the semester when the activities with Korsakow began. These activities were set as the last two stages of the full semester project. The full semester projects were planned accordingly with a methodology for developing an interactive video or installation under the broad theme "Water". Students in the second year (2012) had the liberty to choose another theme if they wanted. Although in both editions, activities developed during the research study were mostly the same, benefiting from the earlier year experience, the professor renamed some stages and created some further stages for the second and third phase of the project (See Annex 20 - Syllabus 2011 and 2012).

Project stages in the first year (2011/2012):

- **Phase I - Conceptualization:** Stage 1 » Idea drafting (brainstorming); Stage 2 » Research; Stage 3 » Idea development (post/presentation);
- **Phase II - Development:** Stage 4 » Interactive video structure and development (presentation);
- **Phase III - Presentation and publishing:** Stage 5 » Posting online of the final version and final presentation

Project stages in the second year (2012/2013) were more detailed:

- **Phase I - Concept:** Stage 1 » Research – Initial study (post/presentation); Stage 2 » Drafts – Ideas presentation; Stage 3 » Idea selection for

development: requirements and contents (post/presentation);

- **Phase II - Development/Representation:** Stage 4 » Interactive video project structure; Stage 5 » Capture, editing and videos pre-selection; Stage 6 » Interactive video development with application multimedia content integration (post/presentation);
- **Phase III - Presentation:** Stage 7 » Ending phase project presentation; Stage 8 » Posting and advertizing of the online final version.

Before *Phase I,* two activities were set for students to present their expectations and objectives and to present themselves. In both years students had to post a presentation on the class blog. As suggested by the stages' setting the first phase was exploratory and students started developing ideas and research in order to make their projects. These earlier activities were not observed as part of this study but rather helped to set the learning environment and therefore are briefly described here.

The first activity was a drawing activity where students made a list or visual map of their objectives and expectations concerning the course[77]. For the second week students presented themselves to class publishing in the blog a visual map made in *Vue*[78] and/or *Prezi*[79] (in 2011) or a photo and a written description (in 2012). In the *Phase I,* students developed an initial project proposal where they posted one image, one visual map and references to present their projects. Students also made an oral presentation of their projects in class. In this class, after students' presentations, the groups were set accordingly with students' interests in each other's projects. These earlier students' activities promoted:

- Online search;
- Class discussion of ideas;
- Selection effort according to time and budget limitations;

[77] The result of these drawings was used in this research study and resulted in a table with some content analyses (A.21 – IMA).
[78] Vue stands for "Visual Understanding Environment" is an open source application that allows the development of visual mapping of ideas and resources (http://vue.tufts.edu/).
[79] Prezi is an online application that allows creating graphical representations and sequential navigation between ideas and resources (http://prezi.com/).

- Organization of ideas;
- Visual representation of ideas.

Comparing with the UT Austin project students had considerable more time to prepare what they wanted to do before they started shooting or using Korsakow. In 2011 they had a total of nine weeks and in 2012 they had seven weeks. In Austin students only had three weeks before being presented to Korsakow and they had little time to think about or plan what they wanted to do before starting producing their first interactive videos (2 weeks). The duration of the activities with Korsakow was more or less the same time in Lisbon and in Austin (6 weeks). By the end of the semester students were invited to draw another map with what they took from their experience in the semester, the best and the worst about their experience and their suggestions. These elements were also analyzed contributing to complement and reinforce the collected data.

The research study in both years starts in the beginning of *Phase II* and extends until the end of the semester.

The next topic will present the activities that were developed in similar ways as in Austin and the following will present activities that were set in very different ways.

5.4.2. Continuity with what was done in UT Austin

The activities that happen in mostly the same way as in Austin were the class discussion, online search, video editing and video structuring and editing.

In 2011 students were already distributed in groups and organizing their work as a team. In the first day the investigator was presented to class and made a brief presentation addressing some notions of storytelling in the movies (e.g. plot, narrative arch). He made also a small introduction to the history of interactive movies and videos from one first example “Kino –Automat” (1967) to a recent *YouTube* video “How to make an interactive adventure” (by Chad, Matt & Rob in 2010) (See the presentation PDF in Annex 17). Two examples were shown where narrative and structure was not particularly clear. The examples were Dziga Vertov’s “The man of

the moving camera" (1929) and Ridley Scott's "Life in a day" (2011) illustrating ways to present in a linear way projects which could fit in an interactive database project. The way Korsakow films are different from any other types of interactive video was explained showing one example of K-Film and focusing on keyword setting and in the possibility of different endings. The presentation finished showing the Korsakow tutorial example and the invitation for students to download the application and explore the available tutorials.

Class discussions

As in UT Austin the professor introduced some concepts and sometimes asked for the investigator to give some specific contributions. Sometimes students engaged in a conversation around the table and the teacher asked some students to post in the blog their most relevant contributions. One of these examples was the interactive movie "Last call"[80]. The teacher regularly asked for students to feel at ease to ask questions or ask for help in dealing with the Korsakow application either to her or to the investigator whenever they needed.

In the first year (2011) the focus group sessions were done with all the students present in class divided in two groups of nine and one group of seven. In the second year the session was done with eight students. There was one ERASMUS student in class that did not participate because he could not speak Portuguese. He was not comfortable with the idea of making everyone else speak English because of him and the researcher decided not to include him in order to not compromise the participation of the Portuguese speaking students that would not be fully comfortable speaking in English. In the focus group sessions there were very interesting discussions and students also enjoyed the collective maps making activity. In the class of 2011 as there were many students doing the same theme it was interesting to make an analysis to the

[80] Interactive Horror Movie "Last Call" - This movie played in a regular theatre taking advantage of viewers own mobile phones for setting interactivity in motion. When buying the tickets participants were asked to provide their cell phone numbers and to be available to answer the phone during the show. In several occasion of the movie the protagonist would call someone in the audience to ask for help or orientation in order to decide what to do (e.g. while running from a threat, to go up or down a stairway). The actors would act accordingly with the audience response providing a great deal of immersion (http://www.youtube.com/watch?v=386VGKucWDo; http://theinspirationroom.com/daily/)

collective results. Gathering all maps the 25 maps had on them 191 written words/expression connected to each other and numbered from 1 to 3 in terms of difficulty students would have in defining their meaning (1 - easy to define, 3 - difficult to define) (the word water does not count as it was the same for all project). There were some words that were chosen by several students (e.g. the word "*wave*" was written six times, "*life*" was written five times, "*calmness*" four times). There were some ideas that were expressed in different ways. For example the concern of with water pollution was mentioned seven times by expressions as "water use awareness", "water management", "environmental awareness", "pollution", "water economy" and "water renewal". There were many words that were mentioned two or three times, so that only 141 different words were used. And as some words have very similar meanings (e.g. "fluid" and "liquid") only 128 different concepts were counted. It was interesting also to see that the same concept "life" would be considered as difficult to define for some students, intermediate or easy for others (e.g. figure 40).

Figure 40 - Two maps examples where "life" ("vida") is rated as 1 in difficulty (left) and as 3 (right.

Online search for media

Students used the internet for long periods of time searching for multimedia examples. This search was done both looking for inspiration but also as references to support their approaches to the theme. Although students were not required to use archive video or images from the web in their projects they were asked to present references to sustain their options and frame their work within the existing artistic context. With this approach even if some projects did not include online materials, students did present online materials in the blog or in class. In the final interview of 2011 the professor confirmed this observation telling that in all phases of their project students search a lot online (A.16 – Professor's Final Interview 2011 - P5).

Video production and editing

Video production and editing was part of all students' projects. As in Austin the teacher did not require movies to have professional quality and it was not of much relevance the quality of the image and definition.

As some students in the U Lisbon project had never recorded with camera the teacher discussed with some students or groups some basic notions for the capturing process and some technical tips for managing and editing the videos. But even so the teacher made clear that with proper justification all recording or video editing options could be considered (e.g. if students wanted to record their videos with their mobiles they could). Contrary to what was done in UT Austin there were no SNU maximum duration for the interactive project and students were free to use only archive video from the web, to use only their own video or both.

Interactivity structuring and editing

Although most students had already started defining the structure of their interactive videos before the beginning of *Phase II,* some did not have a clear idea of the structure they wanted to use and needed to discuss it with the professor or with the investigator.

The teacher asked for the maps to be presented as part of the presentation of

their projects in the blog, but these maps mostly showed broad ideas and not a direct relation between videos. It was mainly in *Phase II* that students started defining their maps identifying SNUs. For this mapping activity some students used the *Vue* application but the majority opted to post in the blog their hand drawings.

As already mentioned, in the second year students could choose other applications for editing interactivity rather than Korsakow, there were two projects developed with other tools. The solutions used were completely different from Korsakow. One was based in HTML5 and linking between different videos was made with direct links and the other project consisted in body interaction in front of the screen. Therefore their structuring and editing process was not part of this study.

Students learned to use the application partially on their own and at home but having in class tutoring and guidance whenever they needed help for solving some more common problems. In the two years there were made five participatory observations that will be further addressed in the semantic hypermedia production topic and when we return to some further notes about the Korsakow interface issues regarding the last version used in 2012.

5.4.3. The main differences from the UT Austin project

Online presentation of Assignments (Blogging)

While in UT Austin students managed their own blogs in Lisbon it was the professor that created and managed a collective blog. The teacher made a big investment on each class blog, publishing all important information concerning the course. Students were enrolled in the course blog as editors and had specific assignments where they should post their outcomes. Students could also make one post for the whole group project. Besides these mandatory posts students were invited to post course related topics or examples mentioned in class.

The teacher observed closely the students' activity in the blog and would make some comments and recommendations which were then reinforced in the class. Students were also invited to comment each other's posts. The whole posting activity

generated about 14 200 words and more than 200 images in the first year and 13 500 words and about 120 images in the second. In the first year there were 15 students' comments and three of these were answers to professor's comments. The remaining comments were mainly students showing their appreciation for other's works. In the second year students made more written comments (30 students' comments). That makes about two comments on average per student. Blogging participation was not very enthusiastic in the first year but somehow recovered in the second year. On one hand students got to see and influence each other with their blogging activity but on the other hand published considerable less than in UT Austin in what concerns posts length. Most students in from UT Austin wrote more than 5000 words in only eight weeks while students in U Lisbon project wrote on average less than 1000 words in the whole semester.

One final assignment was to send the teacher each project's final movies and supporting materials. Following the final post in the blog the interactive movies and selected materials were posted in an online gallery or collective portfolio webpage[81].

Final presentation and discussion of each others' work.

While in UT Austin only one student's project was presented in class for discussion in U Lisbon all projects were presented by students and discussed in class.

In UT Austin the final activity for students to explore each other's projects in the class was done using desktops to play with the videos. In the U Lisbon students made an oral presentation of their works for about five minutes and there was some time for oral discussion and comments. In the first year this time limitation was surpassed most of the times as all group members were supposed to say something. However as that happened in the last days of class in the semester, made students feel these presentations were more like final examinations.

Students did not made comments without being directly asked to comment and most of the time it was the professor that made first comments and then asked students

[81] The online platform used is called Cargo Collective (http://cargocollective.com/)

to also intervene. Students mostly would only say that they liked the project. In a presentation in the class from 2012 for example there was one episode that showed that one student was not much receptive for other student's suggestions. It also suggests that some students were not prepared to propose suggestions in a constructive way.

> *"Professor: Do you have comments, suggestions or questions? I would like you to make question. Asking how was it done or how would you do it.*
>
> *Student commenting: I think that this green is too shocking!*
>
> *Student presenting: This green was taken from the game (Interface inspired in Space invaders game)." (Conversation from last presentation day recordings)*

It had to be the teacher to try to show the student making the presentation why the color choice was not working for most people and how could he try to make it better. Only in the last presentation of the day there were more constructive comments. But the number of comments was still much lower than in the UT Austin shared comments folder in the final commenting activity done in UT Austin class.

These changes did not affect the design research methodology already used in UT Austin. The only change concerning research methodology implementation had to do with the possibility to make the initial and the final questionnaires both for diagnosis and satisfaction feedback of students as was earlier designed and not only applying one questionnaire in the end.

5.5. First edition model's evaluation

The implementation of the learning model and of the research study benefited from the earlier experience gained in Austin. The research study also benefited from an increase of participants as the number of students more than doubled. Participation in questionnaires was high with more than two thirds valid replies, making quantitative analysis more noteworthy.

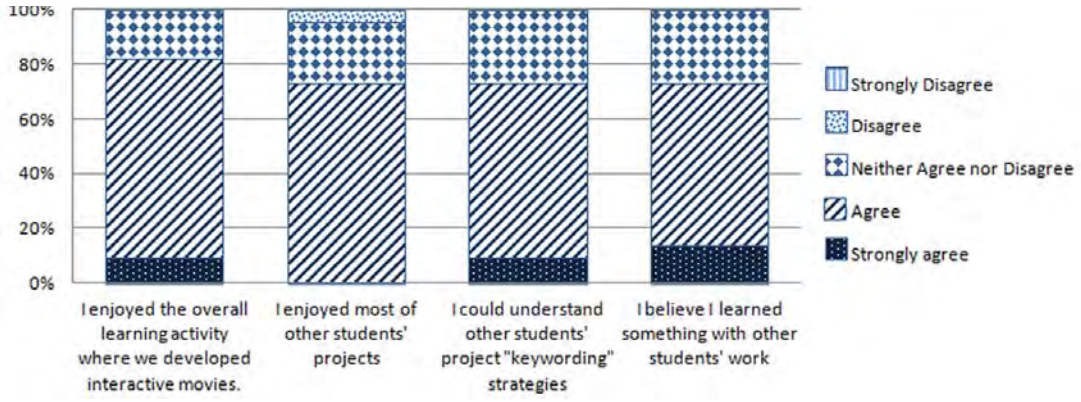
As already mentioned, the analysis of the written initial activity proposed in the

beginning of the semester, will also contribute for this evaluation, as well as the final feedback exercises done in the end of the semester. Some conclusion of this analysis were already mentioned in the student's description as participants but will further be explored along the analysis of the other collected data.

5.5.1. Participants' satisfaction

In 22 students that replied to the final questionnaire 18 stated that globally, they enjoyed the activity as a whole (A.15 – FQ11, Q3 - item 1) and no one disliked it. There were also a majority of students that enjoyed others students' projects and believed they learned with them (see Table 14).

Table 14 - Reply to some of the items asked concerning their appreciation of the activities developed with Korsakow (A.15 – FQ11, Q3).



About half the students also agreed that they would like to use Korsakow again in other courses' projects or in out of school projects (See Table 13). The professor was also satisfied with the used learning model and said, in the final interview, that she would repeat the same activities in the future. Eventually only with minor changes in what respect the amount of guidance for students to use the application, manage their files and the time for finishing the projects.

The teacher said that the activities would benefit if the class had fewer students as she could have a closer approach to each project and to each student. This was also felt by most students as being the worst thing to point out in the whole semester.

"The worst: class too big." (Student, in a comment in the last class map activity)

Students satisfaction derive from several aspects of the class but most students agree in two positive features:

1. Good amount of references (e.g. open-source projects and applications);
2. Good atmosphere in class.

Enjoyment

It was easy to understand that in some projects there was a lot of fun in the production. Some projects were in their essence oriented as games and two projects were related with playing with water. And the professor felt that students "enjoyed the given examples, the demonstrations and the application in itself" (A.16 - PFI11, P18).

Engagement

The professor believes that motivation increased in the last weeks of the semester as they started using Korsakow and verifying that it worked. But she also felt that part of this enthusiasm and hard work demonstrated was because there was still much to do at that time and it would be the only way to finish the project on time. The professor believes that part of the resistance to start editing video and editing interactivity had a lot to do with group dynamic. (A.16 - PFI11, Q17 and Q18)

Group management

In class groups seemed to work well and no major conflicts seemed to exist. Having the questionnaire as reference the great majority found the team work was good (21 out of 22) (A.15 – FQ11, Q4 – Item 7). Three students even chose the topic to be addressed as things that worked out well.

"The group interactivity and relationships [worked well] at the level of task distribution, teaching and learning with each other." (A.15 - FQ11, Q7)

"Group work was fundamental." (A.15 - FQ11, Q7)

Only two students found some frustration concerning work management:

"The group tasks distribution was ill managed." (A.15 - FQ11, Q8)

"Not all elements of the group contributed for the work dynamic." (A.15 - FQ11, Q8)

Although the professor believes there were some groups where management was lacking, she considers that there was much collaboration and negotiation within groups and between groups.

"I believe that in what concerns collaboration it was a success." (A.16 - PFI11, P 14)

Level of technical support

Most students found that technical support was adjusted (15 in 22)(A.15 – FQ11, Q3). And technical problems with Korsakow were not greater or more frequent than in UT Austin. Nevertheless some students were giving their first steps in dealing with computers to manage image, sound and video. This lack of experience of some students made some of them to feel left apart and more isolated to deal with their problems. One student from the CAP considered technical support was lacking at all the production levels (video, image, sound and interactivity). He suggested: "More support in editing, recording, sound, image for the materials used in the interface." (A.15 - FQ11, Q9).

Expectations

Going through all the maps done by students in the first class of the semester one can conclude that most students enrolled in this course were expecting to work with interactivity and with video. Analyzing them in further detail (A.21 – Initial Maps Analysis [IMA]) one can conclude that the majority of students were expecting to learn about web design and learn how to use several multimedia applications. Actually developing interactive video or multimedia would come as the third thing most students mentioned as expectation, after "learning webdesign" and "learning to use applications"[82]. Some students mentioned "new applications" in the area of multimedia and interactivity, expressing that they were open to suggestions. Although

[82] Some students mentioned they would like to deepen their skills with applications they already used in general. Other specified some application (The application most mentioned as one they wanted to learn was Flash. As for the most used applications, Photoshop was the most mentioned, and Premiere the second mentioned).

Korsakow is mentioned in the course syllabus no one mentioned it. Learning to use applications was not the main aim of this course and therefore some students were a bit frustrated in this matter. Some students mentioned that they would have liked to have more time in class to dedicate to the use of applications.

> *"I believe there was a lack of hands-on in class, I would have liked to learn some basis of other software, even if I needed to go to the web for the majority of the tutorials." (Student, A.15 - FQ11, Q8)*

The teacher was not expecting that most of the students' work would accumulate so much in the last weeks of the semester. And she says she understood that her expectation for students' outputs should be very clear and explicit for all the different stages of the project.

Productivity

The 39 students that finished the year with success were divided in 12 groups. Each group posted in the class portfolio one interactive video. These works were previously presented in class and most students liked each others' group interactive movies (16 out of 22) (A.15 - FQ11, Q3). Two interactive videos were only explorations or illustrations for interactive video installations. One other interactive video was a "behind the scenes" ("or the making of") of the main project they developed until the prototype phase. Therefore only nine groups made the main goal of their projects the development of the interactive video. Some students and the teacher assumed that productivity could benefit from being more distributed through the whole semester and not so confined to the final weeks.

5.5.2. Learning outcomes

As in the UT Austin learning outcomes can be divided into two themes:

1. The projects theme (*water*);
2. The theme of the course (*multimedia project methodology*).

Learning outcomes in the described activities derive mainly from three factors:

- Teacher and investigator led discussions about multimedia and project development;
- Auto-didactic effort (searching for information and guidance online);
- Peer-to-peer and group collaboration.

In the final questionnaire, when referring specifically to the use of Korsakow, there were nine students that disagreed with this sentence "I consider that I have learned very little in this activity" (A.15 - FQ11, Q6). This left five students that agreed with it. This was not expected as most students seemed to like to use the application and replied to the questionnaire mentioning that they now felt they are now able to develop interactive videos on their own. Learning outcomes drive from hands-on activity and are intrinsically related to the students' attitudes and skills that will be described in the following topic (*5.5.3 – Students' attitudes and skills*).

Interactive project's theme

Most research was done over the proposed theme. Several web sites were explored and shared in the collective blog. Also some students gathered information and materials through other means (e.g. books, in loco gathering of information). Students did not learn only from their research work but also while going through each others' work. In the questionnaire, 16 out of 22 said they learned from others' work (A.15 - FQ11, Q3). And most students said they have learned a lot viewing videos online (in the final questionnaire 14 students out of 22) (A.15 - FQ11, Q5). In the posts for *Phase I* more than 65 links were shared collectively and interactive materials developed in *Prezi* contained more data, ideas and links for other references. Some final projects also reveal there was an effort in gathering information and translating it to a new way of presenting (see example in figure 41). The example "A talk in 2050 – The lack of Water" has more than 15 minutes of video with original script.

> *"Our project aims to raise awareness to the problems that may occur in the future, if we don't act carefully with the use of water today. "A talk in 2050 – The lack of water" reveals a dialogue between a Grandmother (who lived in our time) and a Grandson (who knows little about 2011). The exchange of ideas and different ways of*

life are exposed. The spectator has the possibility of questioning his Grandmother and imagine how it will be, to live in 2050. With a varied range of topics, the spectator will have the opportunity to discover: the life of various animals; how the demographic distribution will be, if the water levels changes; how the future of forests will be and what changes we will have in our habits, with only 38 years of distance. We invite our visitors for a trip to the future."(Student - Projects' synopses in the Class blog)

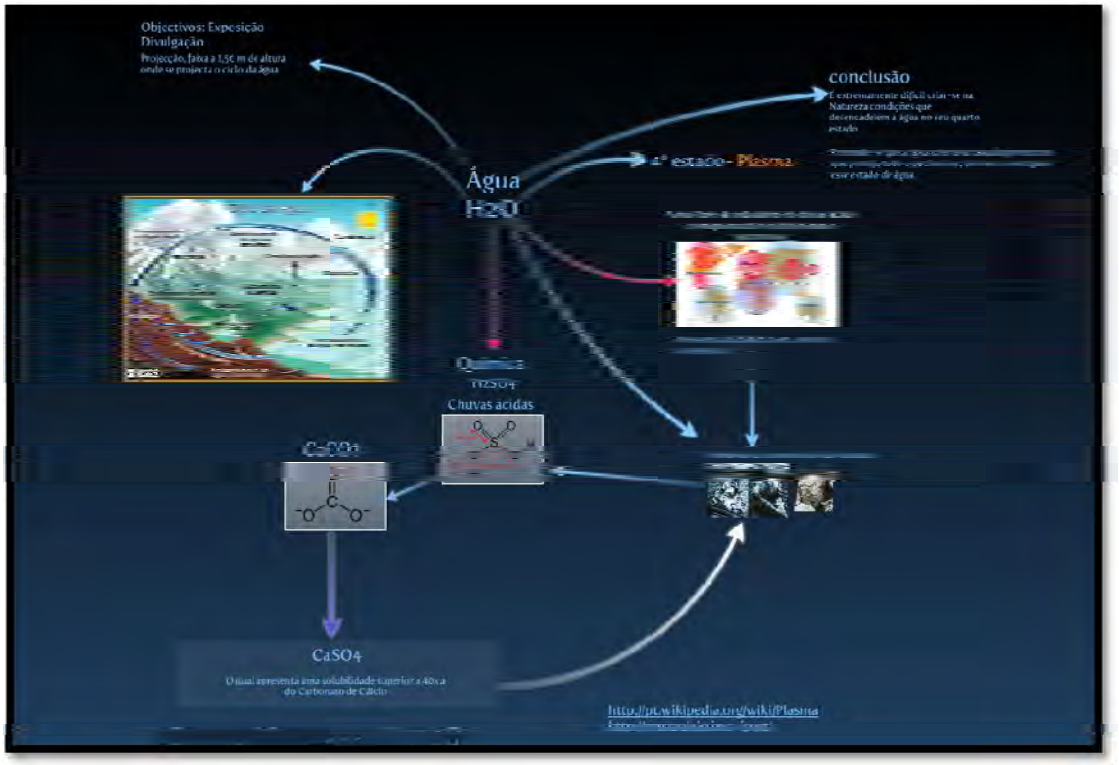


Figure 41 – This image is a screen grab of one students Prezi presentation posted by the student in the blog. It reveals a drawing of the water cycle, a map with acid rain distribution in the world and the effects of acid water in monuments through time.

Multimedia and project topics

During the planned activities students were presented to diverse themes. The list of the most important topics is presented below:

- Authorship and intellectual property;
- Creative process;

- Video formats;
- Linear and multi-linearity narrative;
- Interface design and interactivity;
- Digital literacy evolution;
- Multimedia project management.

The main bibliographic reference, by Lovejoy (2011), addressed the first two topics, and interface design and interactivity discussion were supported by recommended books as The "Art of Human-Computer Interface Design" by Laurel (1998) or "Sketching User Experiences: Getting the Design Right and the Right Design" by Buxton (2007). Managing one's project was very frequent conversation topic. Not only were phases described in the syllabus as the professor insisted for students to keep up in the delivery of each phase assignments. Learning outcomes were mentioned also in the comments in the final questionnaire as students seem to have enjoyed the learning process and wanted to leave a positive comment on that. Learning about the creative process was mentioned by one student:

> *"I am [now] aware of some sites with interesting utilities for the creative process" (A.15 - FQ11, Q7)*

In the final comments one student wrote that the best thing in the activity was the "acquired knowledge and its application" (A.15 - FQ11, Q7). The statement reflects what was earlier mentioned. Rather than knowing definitions by heart what was supported here was the capability of applying discussed ideas.

5.5.3. Students' attitudes and skills

As in UT Austin, the U Lisbon courses also had a hands-on nature focusing activities in technical skills that were valued and developed throughout the whole semester. In U Lisbon the course further focused the development of project and design methodology emphasizing work management and organization. Collaboration and team work attitudes and skills were also stimulated in a different way as students since *Phase II* developed their interactive videos in group. As in chapter 4 the skills

will be addressed following four main categories that allow distinguishing those mainly related to the use of a semantic approach to hypermedia production and those related to the use of the internet both as media provider and as a communication environment.

Video production for interactive projects

Video and filmmaking for internet based interactive projects should comply with certain rules that were highlighted in the development of this project. The awareness that some students had never edited video before required a special attention from the professor that tried to help those students most in need. It also made the professor more tolerant with overall video quality of the projects. To ease some students' tension regarding their lack of experience she mentioned several times in class that the projects did not need to look finished and that she would be happy if students reached the level of prototype. The idea was for students to understand the basics of a multimedia project online and for them to understand that methodology is a key factor for developing projects of this nature. In the last interview the professor showed her satisfaction with students' performance.

> *"There were Heritage and Arts (CAP) students that began by clarifying that they never worked with video. They were very afraid with this medium, but (in the end) were able to easily use it. They did use videos and created videos by themselves." (A.16 - PFI12, Q10)*

As in Austin students faced several challenges concerning file formats, converting media, and having to reduce video size to fit SNUs. There was no limitation for SNUs duration but students were encouraged to keep them as short as possible. There was an indication to keep them up to one minute if possible. Several challenges and additional effort related to video production were already described in the UT Austin project[83].

[83] Aspects of video production for interactive projects (topic 4.5.3. Student' attitudes and skills): Managing files for online publishing; Using online file formats; Defining video dimensions and aspect ratio; Managing sound levels; Editing video for interactive projects.

Semantic hypermedia production

Multi-linearity storytelling structuring

When the research study began students were already at ease with the idea of creating concept maps and easily understood their usefulness in what concerns the setting of their multi-linear interactive video structure. Most students started the structure maps of their projects and only some adopted a specific application to make it cleaner. Maps could be very complex (e.g. Fig. 42).

Contrary to students in UT Austin project, most students invested in the definition of the structure of their projects rather than worrying too much with the need to tell a story. Several students were focused in providing experiences to the users instead of keeping them longing for the development of a character or plot. There were several projects that looked more like games providing a mission for the user to accomplish. These projects also required a lot of structuring. For one of these game-like projects the group carefully planned all the possibilities also developing complex structure maps (see Fig. 43).

Besides hand drawing students mainly used *Vue* and *Prezi* for their maps structuring activities but in the blog and in the focus group they also mentioned other applications that they used (e.g. *MindNode* and *Mindmeister*[84]).

> *"I have used MindNode and MindMeister for iPad. In my opinion they are more basic and less attractive than Vue. Nevertheless they are great for young children. I have suggested them to my 13 and 16 year old cousins' school works." (Student, from class blog)*

[84] *MindNode* web page - http://mindnode.com/; *Mindmeister* web page - http://www.mindmeister.com/

Figure 42 – Complex structure maps for interactive video draft on paper (published in the blog).

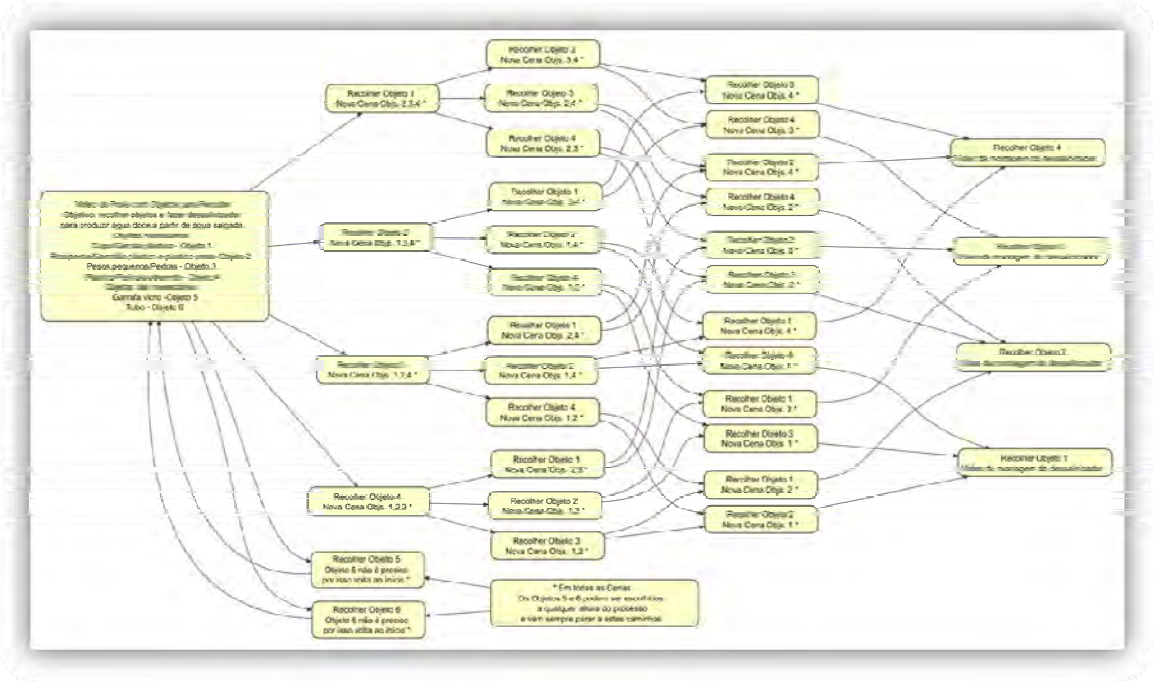


Figure 43 - Structure of one of the game-like projects made in *Vue* (published in the blog).

Semantic hypermedia coding

The easiness with which students developed concept maps seems to have favored the way they have set the keyword strategies. The teacher made clear it would be important to conceptualize the navigation structure between videos in each project. Some students understood quite rapidly how their project could be translated into a K-Film and in their first structure draft could show their keywords strategy (see Fig. 44).

Most groups discussed their mapping structure with the professor and some also asked for the investigator's opinion. These discussions allowed the investigator to develop a perception that some groups had defined their interactive videos structure with direct hyperlinks focusing too much in rigid structures.

Although there were some projects with very complex maps they revealed to be based in a fixed structure where for each video the user would always have the same options with no room for randomness. Some other groups wanted to create their

projects more like a webpage where there should be a kind of home page from which the user could control their navigation (also with fixed links). These two ways of setting their interactive films showed that some students had defined very specific ideas for their project before considering more fluid structures and the Korsakow possibilities presented in the first class of *Phase II*. Some of these students still evolved their projects toward a less rigid structure, but not all.

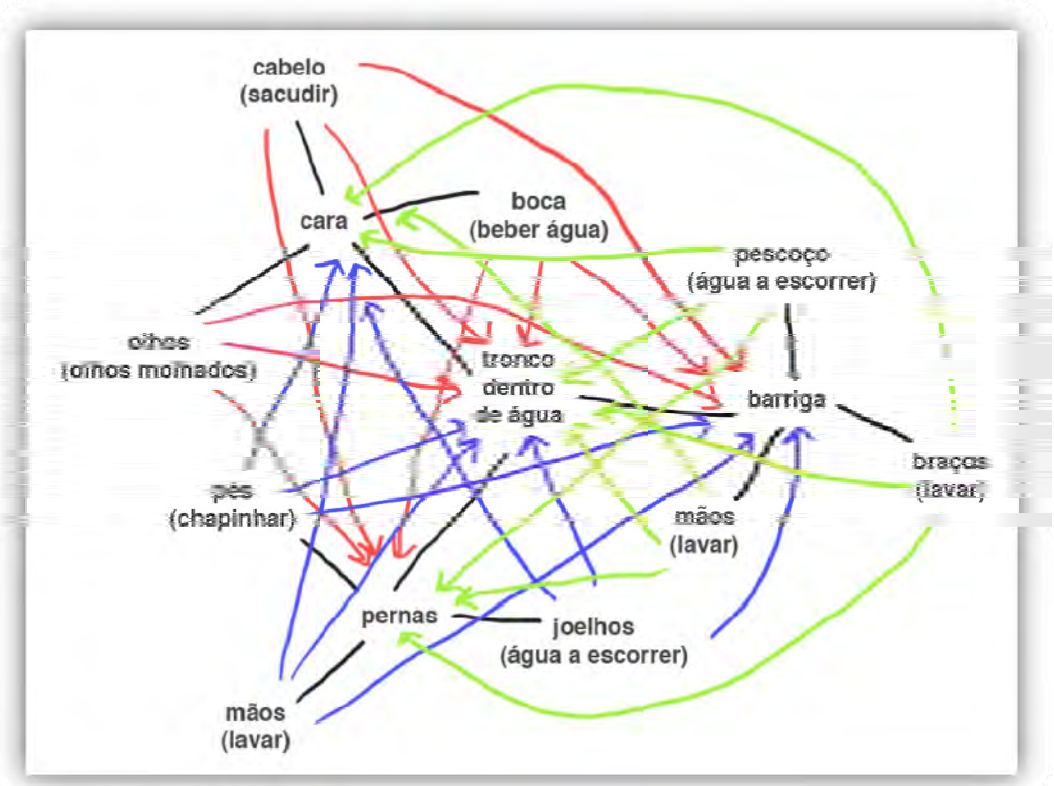


Figure 44 - The color of the arrows identify a keyword strategy based in four Keywords that manage the semantic structure of the K-Film (published in the blog).

Emphasizing concept map construction seems to have this risk associated. This is probably the main reason why Florian Thalhofer, the creator of Korsakow, does not recommend their use.

> *"Don't map out the project in advance. Korsakow films are not like 'Choose your own adventure' stories, ie they don't have fixed links."*[85]

[85] From Korsakow "Tips and tricks" web page - www.korsakow.org/learn/faq/quick-start/tips-tricks/

In this project students' experience with maps seem to have provided good results. Contrary to the UT Austin classes it seems most students did develop their structures a lot further because of the visualization they made, and could easily share their ideas with each other and with the professor. This helped the professor and the investigator to support their projects in most efficient ways. By showing their structuring strategies with maps, like the one presented in figure 45, students facilitated the discussion of Korsakow logic and potential applied to their projects. This made students further interested and engaged in the process.

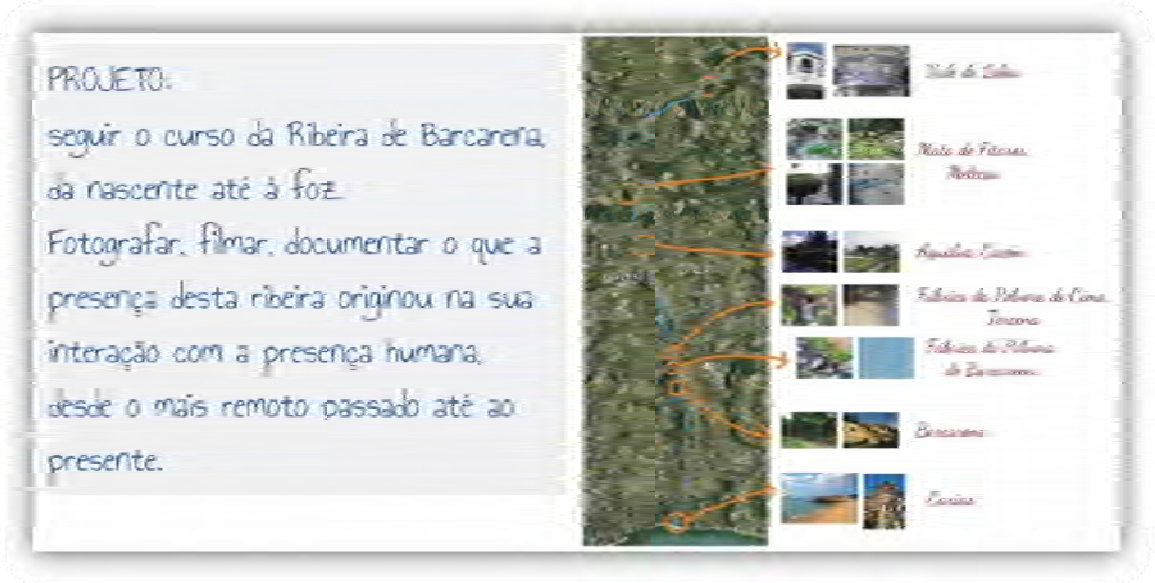
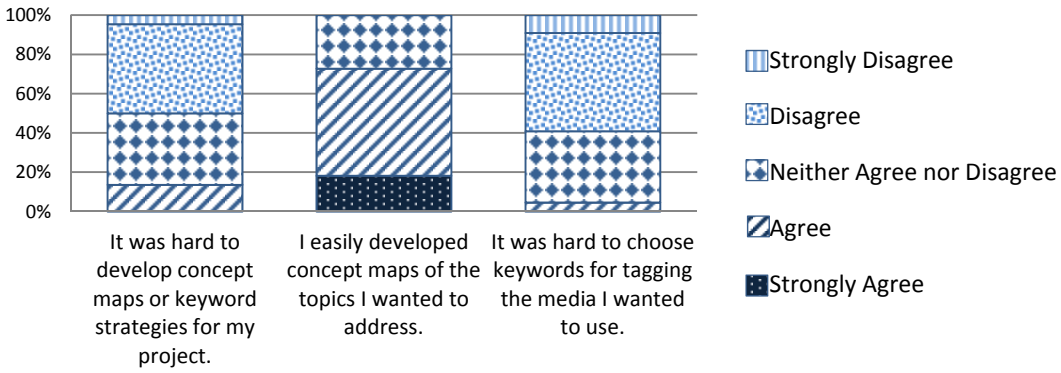


Figure 45 - Initial presentation of the project "Ribeira de Barcarena" when the students had the idea of creating fixed links for each spot of the river they were planning to shoot.

One of the projects named "Ribeira de Barcarena: effects of the course" is one of these projects that evolved from a simple fixed link project to a solution that included two different navigational options, one with the fixed previews (or *fixed links*) along the stream map on the left of the main screen, and the other with automatic previews above the main screen (see Fig. 46). Comparing with the results in UT Austin it seems that this approach in U Lisbon contributed for students to be more at ease with the whole structuring and *keywording* effort. In the final questionnaire most students agreed that it was easy to develop concept maps and keyword strategies for their projects (see Table 15).

Figure 46 - Final interface of the K-Film "Ribeira de Barcarena" with fixed links on the left and automatic generated links above allowing some degree of choice between locations close to each other and between spots with same kind of pollution or local community problems.

Table 15 – Students' level of agreement with the statements bellow (A.14 - FQ11, Q10).



Most students seem to have understood each others' projects *keywording* strategies (16 out of 22) (QF2011, Q3, item 9). For this understanding the sharing of maps in the blogs may have helped. The complex keyword structures seems to be easier to understand with maps like the one in figure 47 that represents some clusters of videos associated with a categorizing keywords

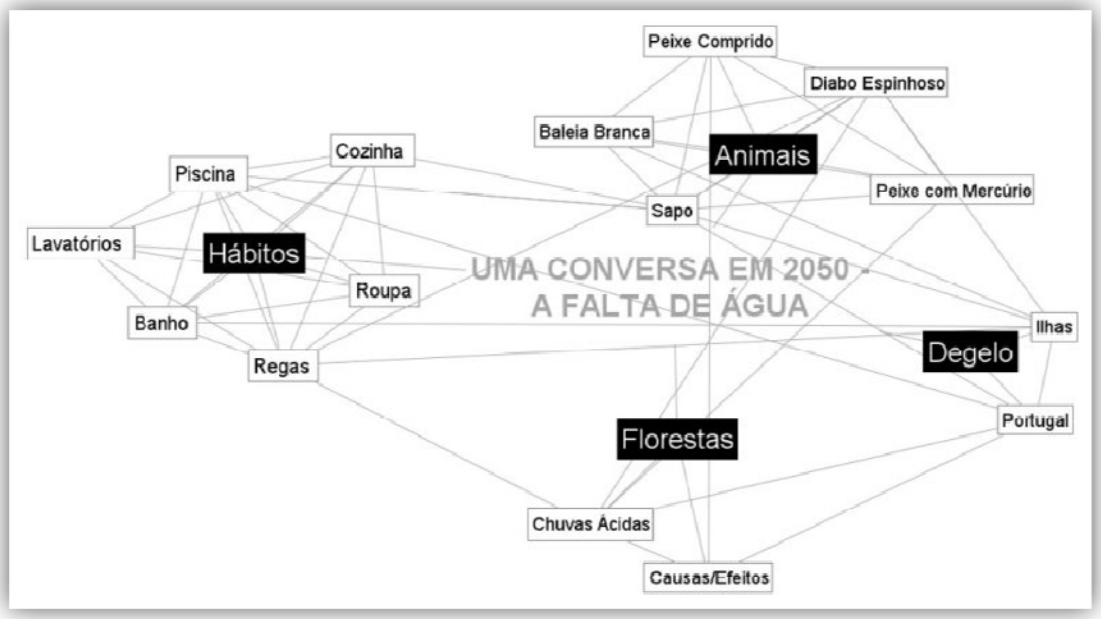


Figure 47 – Interactivity structure map for the project "A talk in 2050 – The lack of water". In white background are the titles of the SNUs and in black background are keywords that are common to each cluster (Habits, Animals, Forests, Thaw) (from class blog)

Desktop multitasking

Students in this class were often close to a computer screen, either alone or in group. Some would be in one of the available class workstations or with their personal laptop. Most students would keep their screens on, even when the teacher was addressing the class. Some students seemed to make an effort to pay attention to the teacher at the same time as they would be searching online or editing their projects on the computer. This could be considered multitasking but often the professor would have to request students' attention as she felt they would be losing valuable information or opportunities to participate in some discussion. One can say they were practicing multitasking but probably this was not the best time to practice it as they might have simply lost valuable class time doing things they could do at home or at other time.

As mentioned in the second chapter most authors that report on studies concerning multitasking in class or while studying refer that most of the time the brain can't manage that well too much distraction and that at least in the long run students

will not benefit from switching between two highly demanding activities.

Managing multiple windows and multiple screens was also usual, and students were free to use their cell phones in class provided that they would not interrupt the class (sound off, and not answering the phone in the class).

Distributed cognition

In the whole semester, but with increased intensity in this project observation period, students used concept mapping applications (e.g. *Vue, MindNode*) to help them structure ideas for their projects. Some students also used applications like *Photoshop* to help the development of their interface layout drafts. Also Korsakow (as in UT Austin) helped to further support the final setting of what and how students wanted their projects to work and look like.

Exploratory engagement

More than in UT Austin, students explored Korsakow by themselves. The presentation of the application's interface by the investigator was very brief showing only the basic steps for editing using the tutorial example. This allowed observing how students react to the application with less influence. More time was left for students to play with the application in class where they could have the investigator or the teacher's individual tutoring.

Although students were aware of the need to use the Korsakow application since the beginning of the semester there was some resistance to start using it. It took several days for students to feel the pressure to use the application and most of them made their first exploration at home. Some students only started exploring the application in class in the second and third week of *Phase II*. Some students explored the application in groups and others explored them alone developing separate parts of the project. All students were supposed to contribute to the editing effort, but as there was no strict control by the professor it was noticed that some students did not explore the interface as deeply as others.

From the 22 students that replied to the questionnaire 14 agreed that it was easy for them to adapt to Korsakow interface (A.15 - FQ11, Q.6). The majority (86%)

agreed with the statement “I feel that I am now able to build interactive movies by myself.” Confirming the idea that some students were more dependent on the group, there was one student that did not agree with the sentence (A.15 – FQ11, Q.6).

Internet usage as media provider

Appropriation

All students wanted to be creative with their works and most projects used their own video. Only four out of twelve used others materials in the final version (in earlier stages there were a few more projects that used other’s media). But using materials is not the only way of appropriation. Most projects assumed their background inspiration presenting several references. This is also a valid kind of appropriation. Not of media itself, but of ideas, that inspired video production style and forms of interactivity they wanted to see in their projects.

Collective intelligence

By the kind of doubts presented the online tutorial seemed to be less used than in UT Austin. Maybe because some students were not at ease with English and the tutorial is only available in English. The preferred way to solve their difficulties was to ask the teacher or the investigator. Some issues would be solved in the moment, others would not have an easy solution (using Korsakow functionalities) and students were encouraged to rethink their interface or organization scheme.

Most students agreed with the idea that they learned with the work of their peers (73%) (A.15 - FQ11, Q3 – Item 10) and also from videos watched online (64%) (A.15 - FQ11, Q5 – Item 3).

Judging by the percentage of the initial and final questionnaire answers related to study habits it seems that studying with friends might have increased as studying more than one hour a day percentage of students increased from 20% in the initial questionnaire to 32% in the final questionnaire (A.13 - IQ11, Q8 and A.15 – FQ11, Q1).

Judgment

In consonance with the initial questionnaire where most students showed very low levels of trust with online content, in the focus group some students expressed their views about the limitation of the web concerning reliability. The major concern expressed was that anyone can publish online and can even keep their identity undisclosed. But as in UT Austin, students were able to identify during the session some ways of sorting out which sources of information to trust more. In the questionnaire's answers most students (73%) agreed that they were able to find ways of verifying the quality and reliability of the materials they chose for their projects (A.15 - FQ11, Q4 – Item 3). So not only they learned ways to trust online content but some of them felt the need to apply this knowledge during the activities. This entails an evolution in what concerns self confidence when engaging the amounts of information available online.

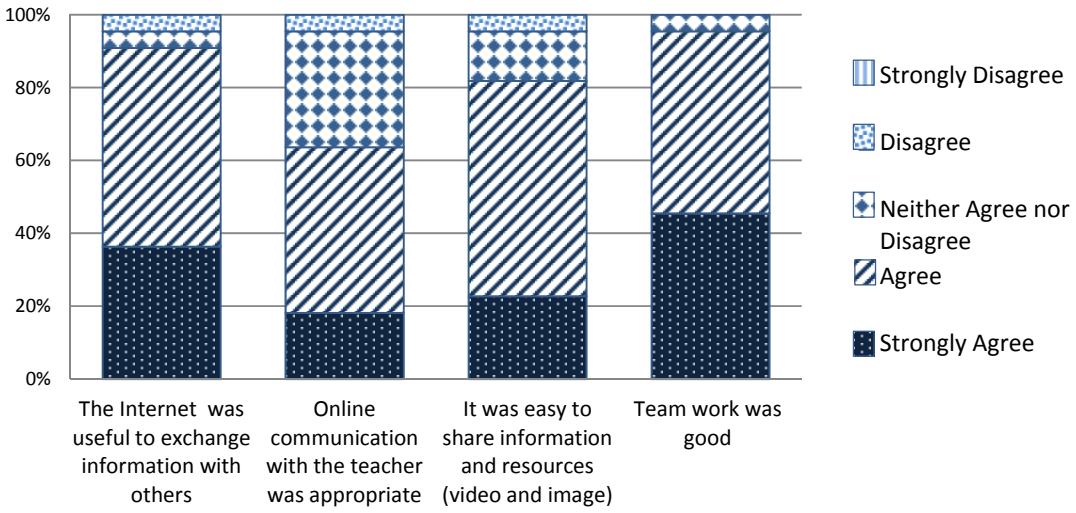
As mentioned in the third chapter judgment is one skill that entails critical thinking. The teacher believes that students developed their enquiry skills in the processes of choosing their themes and their main references. One already mentioned example used to start some discussion on the theme of water was Al Gore's movie "An Inconvenient Truth" (2006) that provided ground to address sustainability issues but also media campaigns and manipulation.

Online communication and collaboration

As already mentioned the blog was a central area for communication between the professor and students, but it also functioned as an important place for students to follow each others' work. Students also used e-mail to enter in direct contact with the professor and with each other. As reported in the questionnaire some students also used chat and forums to contact with each other. As presented in Table 16 most (91%) agreed that the internet was useful to exchange information with their peers. Also in Table 16 the graph shows that students reported online communication with the teacher to be appropriated and that most students had no difficulties in sharing content online. Groups work experience seemed to be good for the great majority of

students as 95% found it positive (see Table 16).

Table 16 - Graph representing the students' answers to the question "Regarding your internet and social networking experience, please indicate your level of agreement for each of the statements" (A.15 - FQ11 – Q4)



Networking

Online publishing was not a new activity for most students at least by the beginning of *Phase II*, as in the questionnaire only 40% of students replied that they never had published on blogs before. During the whole semester there were 98 students' posts. With 36 students publishing, the average of blog posts per student was only 2,7 posts. As was already mentioned this generated about 14 200 words and more than 200 images. There were no discussions and besides the assigned posts there were only two spontaneous posts addressing issues discussed in class. Students' comments were scarce (11) and mostly strict to the point with no more than one line. These comments were generally to congratulate the work presented.

The teacher published 19 posts and made 12 comments to students' posts mainly answering their questions. Posts generally reinforced all of what would be required for the next assignments phase or expected for next class (example in Fig. 48). The teacher said she prefers this to sending mails with big mailing lists as she

had the previous experience of always having students say they did not received the mail for some reason. The professor commented to the researcher that "having it in the blog no one can complain".

There were also three more students' comments in response to the teacher's observations. In fact in the beginning students would be posting almost as they were writing an e-mail (starting with "Good afternoon…"). This contributes to the conviction that some students were using blogs for the first time, but by the end of the semester they were more to the point and publishing well structured posts. The professor also defined some rules for students to follow when publishing that resulted in better posts and some correction made to earlier publications. For example the teacher wanted:

- Posts to be categorized and with tags;
- That posted images would have legible lettering;
- That external links would open in new tabs.

Through the development of the blog one could see students being more watchful and getting their posts more professional. Also in this way students were introduced to several widgets, such as the category cloud of the blog and saw it change as more students changed the categories of their post from uncategorized to some of the proposed categories. The use of forums and e-mail was also noticed in class and referred by some students, but comparing initial and final questionnaires it does not seem to constitute a significant change in what concerns students habits (A.13 - IQ11, Q11 and A.15 - FQ11, Q2). Comparing replies concerning media habits in the beginning and in the end of the research study it seems there were no considerable changes.

The final K-Films made by students were presented in *Cargo Collective* (Fig. 49) along with an introduction and images. This idea of sharing content in another website with a specific audience was well accepted.

Figure 48 - Print screen of the class blog front page in *Wordpress*.

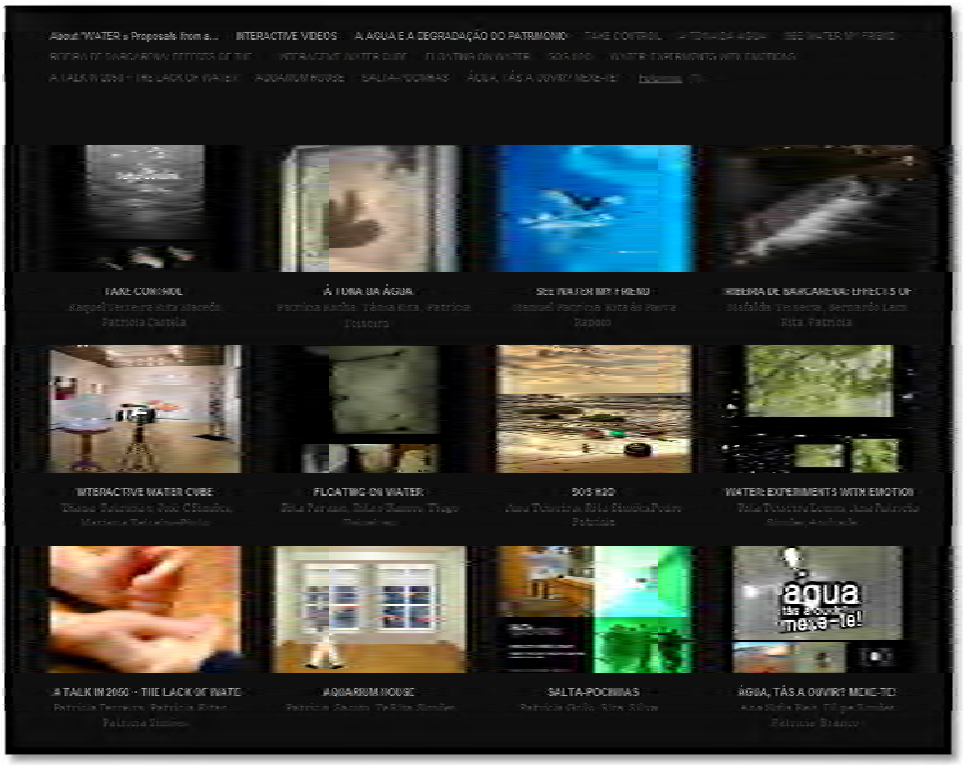


Figure 49 - Print screen with the front page of the collective portfolio of the 2011class in *Cargo Collective* website.

Negotiation

As in the UT Austin project the interface design was an issue addressed in class and that was developed in most projects with the contribution and suggestions of other students. One group wanted to develop an interface that could be accessible for a wide public that could speak different languages. For their project students developed a game-like interactive video with simple graphics (Fig. 50) and adopted the use of visual language based in pictures in order to be easier for anyone to play regardless of their cultural background.

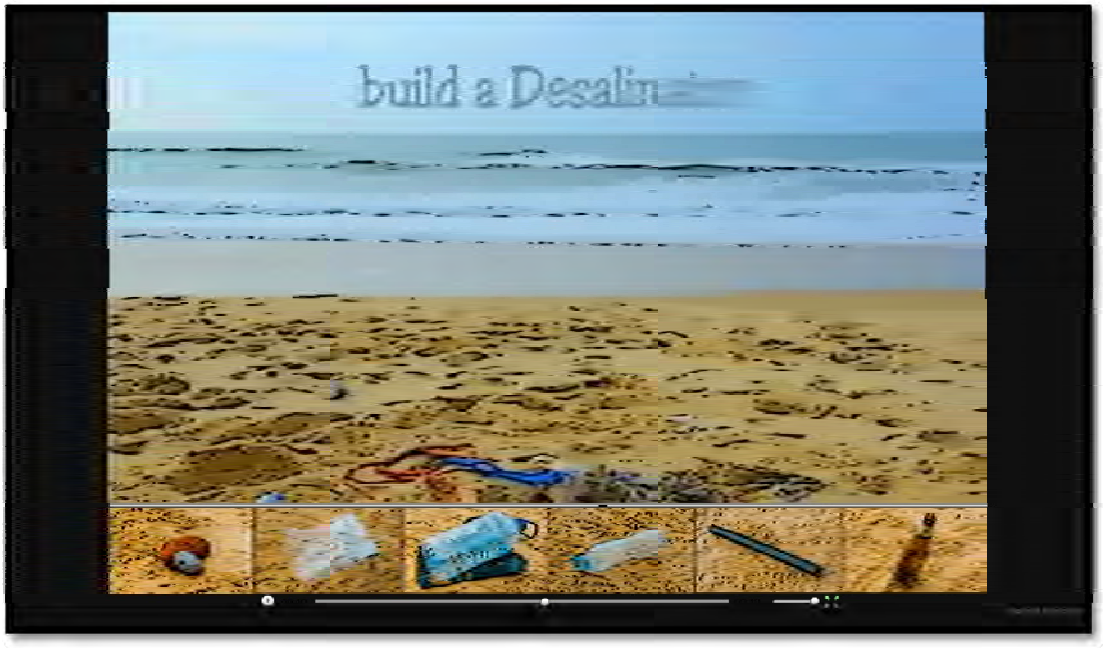


Figure 50 - Interface of a game-like project with 6 options for the user to start building a desalinator with garbage found/collected at the beach.

The idea of shared authorship was also developed in some projects. The idea of interactivity made students aware of the need to keep the audience attention from the first moment and pull the audience to participate in the proposed story or game. Most students grab the idea of the importance of making their audience ask themselves: "What next?".

Working in groups helped students to understand the importance of the contribution of each member and most groups showed interest in others' ideas for the

development of their projects. Presenting their works to the class provided opportunities to confront and discuss opinions on their own works motivating argumentation and the capacity to accept competing ideas and perspectives regarding projects aesthetics and navigation.

5.5.4. Enhancements to the learning model

More control of class activity

Analyzing both comments in the final questionnaire and in the final semester feedback it seems that students had mixed feelings about the way they wanted the class to be oriented. One same student would say that "the class environment was good" and at the same time state "[the] difficulty of keeping order in class" to be the worst thing. Another one would present "Good class dynamic" as the best of the semester and in the comments say that "It lacked some order". Other students made the suggestion to have more class dynamic as there were some "dull moments" where nothing seemed to happen. These comments were from the whole semester feedback but this idea was also expressed by one student in the final questionnaire. In the suggestions the same student asked for "Better management of time in class".

With the great amount of students in class it was very difficult to provide close tutoring to a group without "turning the backs" to the rest of the class and it was noticeable that some students felt these periods of tutoring to be unproductive, especially if they were waiting for the teacher's orientation in their work. To address this issue the professor discussed with the researcher the possibility of having more small activities proposed instead of focusing work on only two major presentations (End of *Phase I* and end of *Phase II*).

More time to learn how to use the software

As mentioned in the satisfaction topic, most students found technical support adjusted to their requirements but from the comments of the seven students, one can conclude they were not completely satisfied and that some more initial orientation

would have been welcomed. Students in the questionnaire and final concept maps suggested:

- More support with the use of Korsakow;
- More time for hands-on work;
- More support for developing alternative interfaces;
- Better explanation of how to program SNUs;
- Better management of time.

Reducing class size and strengthening time management

Guiding and tutoring more than thirty students at the same time is a difficult task. Also the rather different backgrounds and objectives of students from both two classes demanded more flexibility from the professor to deal with different levels of media production skills and software and hardware awareness. Also this made the professor need to balance the level of formal quality and achievement in order to be fair for all students. There was one student that suggested there should be less time for planning the project and presenting it and more time for hands-on work and eventually with shorter technical assignments.

Having assignments and stages described in further detail was also discussed with the professor as some activities that were mentioned for some stages were not done by all students. As we will see in the next section about the 2012 study the professor found the need to subdivide phases in stages (with more subgoals) and emphasize the presentation in the blog of the result of most stages.

5.6. Second edition model's evaluation

Several conditions benefited this second iteration of the project at FBAUL and contributed for an overall better result, both in students learning experience and outcomes. The reduced number of enrolled students enabled the teacher and the investigator to have more time to be with each student. As we have seen most students are from the AM course and as the professor noted they had in general more

experience. The previous year experience and discussed ideas allowed enhancing the activity learning settings in several aspects:

- Redefinition of stages and expected outcomes in the end of each stage[86];
- Definition of specific time in class for students' use of applications;
- Setting one further stage dedicated to online publishing;
- Starting earlier in the semester the use of Korsakow;
- Usage of the previous year projects as examples for students;
- Presentation of online K-films examples from Adrian Miles classes;
- The teacher was more supportive and reserved more time for tutoring students;
- The teacher was more demanding from students;
- The professor further supported the exploration of the applications' advanced possibilities.

All these seem to contribute to make the students' experience more satisfying, to extend learning outcomes, and better support the development of students' attitudes and skills. Also it seemed that students were more demanding with each other and with the professor.

5.6.1. Participants' satisfaction

As in the last year, several reasons exist for students' satisfaction with these last activities done in the final phases of their projects. The first aspect that seems to be notorious was that students liked their final results and most had the sense of achieving a result they were not expecting. As in UT Austin, students were surprised with the application's ease of use and set of possibilities enabled by the application. Most students agreed to the sentence "I was satisfied with the film I/we developed" (63%) (A.19 - FQ12, Q3). In the final questionnaire three students agreed that they would like to use Korsakow in future for academic or personal projects or in other courses (A.19 - FQ12, Q6). In the final class feedback activity there were four students

[86] Already addressed in topic *5.4.1 - Model's implementation.*

expressing this wish. As in the previous year, the informal way in which the class was run was appreciated by most students and it contributed for the development of good relationship between students. In the final questionnaire two students considered that the thing they most liked was:

> *"The interaction with classmates." (A.19 - FQ12, Q7)*

> *"The group work and the mutual assistance between students." (A.19 - FQ12, Q7)*

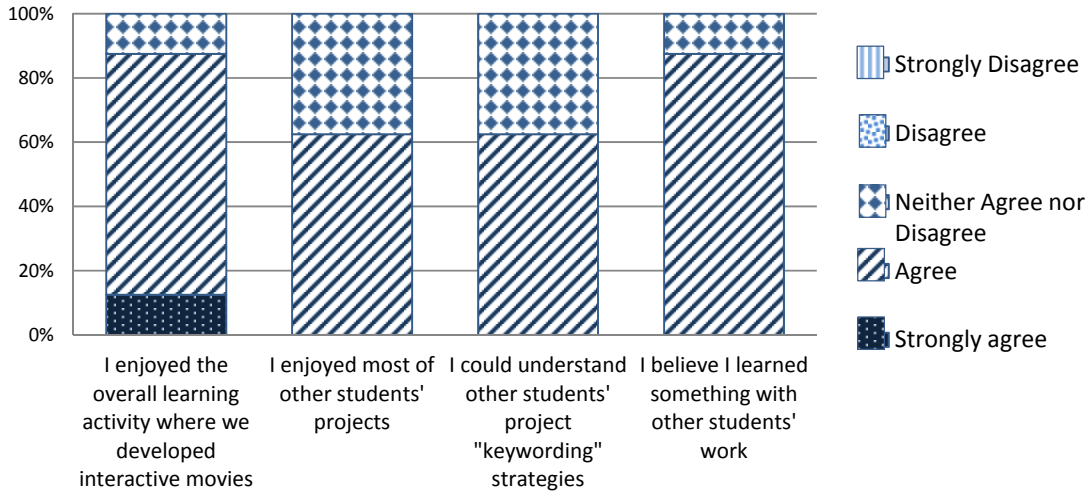
Enjoyment

Some developed K-Films were humorous by the way their interfaces were customized or by their game like structure. Some students' also expressed in their presentation the enjoyment in the production activity. In the questionnaire most students replied that they enjoyed the activity as whole (88%) (A.19 - FQ12, Q3).

> *"In the end I was satisfied with the final results. I believe to have conceived something simple, intuitive and fun." (Student, A.22 - FCF)*

It was also interesting to notice most students liked each others' works and believe they learned with them (see Table 17).

Table 17 - Students level of agreement with sentences concerning their appreciation of the activities developed with Korsakow (A.19 – FQ12)



Engagement

The professor believes that students were motivated from the beginning to develop interactive projects and that most liked the way in which Korsakow helps them to edit their interactive films.

> *"One of the very positive things is the fact that students can have the opportunity to create behaviors without knowing how to program. And they can do it fast. And be enthusiastic with that. (…) The good thing is to be able to work with non-linear structures in a very easy way, in what concerns technical knowledge. And being very enthusiastic, in what concerns results" (A.18 - PFI12, P50)*

One student stated that he never had invested so much in a project. He estimated about 40 hours work for the final stages of development stating that in consequence he had to stall all work for other courses. Including another hands-on course considered the major project course of the semester.

There were only two students that were not much participative being absent most of the last classes. Even so they managed to make the project until the end.

Peer-to-peer learning

The initial idea was for students to make their own project but the teacher allowed two groups to be created. One of the groups was composed by the Erasmus students and the other by two women that complemented each other in the project as one was more at ease with technology and the other more engaged in video production. These two groups worked fine and were successful in achieving their goals. It was also interesting to mention that peer-to-peer interaction between students that were not integrated in groups was intense and productive. One student questioned through e-mail said that one other class mate "made stakes higher" with her project and "made" him go further. This same student dedicated some time helping another one in the use of Korsakow. He also stated that some of his earlier ideas were inspiring to another colleague. The teacher supported inter-project collaboration and these worked out very well. Solidarity between students was high and most liked to learn from the experience of others.

Challenge and complexity

This year students' considered the activity to be challenging. Most of them (88%) agreed with that idea (A.19 - FQ12, Q3). In the final comments and in the final feedback activity one student expressed the challenge regarding the use of Korsakow but also the sense of accomplishment.

> *"In the beginning there were difficulties in understanding the way to use the software. Much search was necessary and several attempts made to reach the intended result and use the videos as was initially planned." (A.19 - FQ12, Q8)*

> *"There were difficulties in understanding the way Korsakow works but they were overcome." (A.22 - FCF12)*

Level of technical support

Technical support was considered adjusted only by three students and one student seemed to find it unadjusted (A.19 - FQ12, Q3). When confronted with their comments in the end of the questionnaire and comments in class these replies suggest that some students were very disappointed with limitations that they found in the application. Two students hope not to have more projects with Korsakow. One of them justified in the comments that this was only because of bugs and errors (A.19 - FQ12, Q6 – Item 6 and 7).

Although the teacher was always present and there was considerably more one-on-one support this year than in the previous, there were still two students that would like to have more guidance in the learning process.

> *"More teacher support and tutoring…" (A.19 - FQ12, Q9).*

> *"I think it would be good to have more classes with tutorials and experiences with the program [Korsakow]." (A.22 - FCF12)*

Expectations

Most students enroll in this course were expecting to work with interactivity and web design. As we have seen in the class description in topic about students this was also confirmed in the initial presentation activity, where expectations had much to do with multimedia production and web design.

> *"[S]ome [students] were expecting to do mostly web design" (Professor, A.18 - PFI, P11)*

In the teacher's opinion some students were surprised with their own achievements. They were not expecting to be able to produce an interactive video on their own.

> *"I believe they might have surprised themselves with their own achievements. They were achieving them progressively. In this way they were not scared with the commitment of making an interactive video. They made it stage by stage." (Professor, A.18 – PFI, P12)*

Productivity

As in 2011 most production work for their project was done in *Phase II*. Some students had already some materials they wanted to use and general ideas for their projects by the beginning of *Phase II* but the majority of the used materials was gathered and edited in this phase. The projects' overall quality seem to surpass the quality of those in the previous year and it is relevant to point out that individual projects were as complete and elaborated as projects developed by three or four elements in the previous year. At least four projects got to present a good interface design with investments done in customized backgrounds and navigational buttons/thumbnails. Some projects also show students effort in video production with a great amount of videos. In total there were nine projects done with Korsakow and two other projects done with other tools. There were several projects that explored the potential of semantic hypermedia logics but at least two of these projects were not fully developed as the number of videos produced was not enough to show the application of the ideas. Nevertheless most students were satisfied with their own interactive videos (75%) (A.19 - FQ12, Q3 – item 3).

5.6.2. Learning outcomes

Multimedia and project methodology topics that were addressed this year were the same ones already mentioned in the evaluation of the 2011 learning model. Students' answers in the questionnaire show that they felt they learned much from

their online explorations and from other peers' works. Several students stated in class they made lots of research. One student made a guided tour with a specialist to the place he was exploring for the project and after that pursued with online search.

As in the last year students comments in the end of the questionnaire valued the learning of new concept. In the questionnaire there were two students that felt they learned a lot while using Korsakow. One of them valued the experience with the application in the final comments saying that one of the things that went well was:

> *"The fact that I have learned to deal with keywords within a logic for creating a non-linear narrative with different interfaces, as well as the exploration of a software in constant update" (A.19 - FQ12, Q7)*

In the final feedback class all seven student referred Korsakow editing as a learning outcome.

There are two examples of students that chose the theme for their projects that also resulted in projects with great development. One project (*ZIBA*) was dedicated to one of the student's favorite beach (*Avencas*) and the other "A História dos Videojogos" (*The video game history*) dedicated to one of the student's favorite hobbies (video games). These two students revealed an extensive knowledge about their themes and they showed many references they found online. Another student chose to have a pedagogical approach to the proposed theme "water". She studied ways in which regular people can save water in their day-to-day lives and selected five issues to bring to people's attention in a quiz-like presentation. She said that it would be a way for people to break misconceptions concerning water usage as people would face their own decisions based on them. Although the semantic structure developed could be used to have more videos to illustrate each issue (the student only made one for each user answer). This project was named "de gota em gota" (*Drop by drop*) (see fig. 51) and the student says she herself learned many things about water waste while doing it. At the same time she believes her project will improve people's knowledge of some good ways to spare water.

Figure 51 - Initial SNU of the project *Drop by drop*

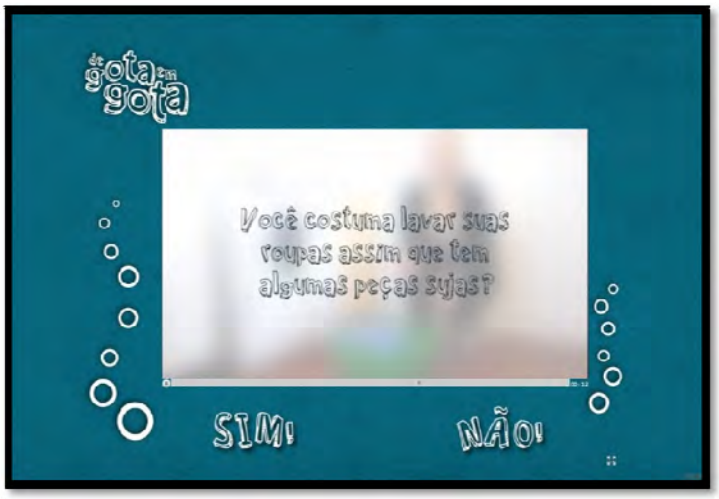


Figure 52 - Interface where the user can answer “SIM” or “NÃO” (yes or no)

5.6.3. Students’ attitudes and skills

Video Production for interactive projects

Most students considered themselves as *beginner* or *intermediate* level in what concerns using video editing tools (A.14 - IQ12, Q9). As students worked mostly individually all had to work with a video editing tool. There was no specific tool defined for this work and students opted to use the ones they had already some experience with. The major challenge was once again dealing with codecs and file formats. Some projects used more than one device for recording and when downloading from the web students also had to edit different formats.

Students also understood the need to keep SNUs short in duration. Projects that used downloaded videos edited many cuts or speeded up some parts of video in order to have shorter segments for their SNUs.

Semantic Hypermedia production

Multi-linearity structuring

As in the previous year most students like to deal with multi-linearity. Students started earlier in the semester with activities where they were supposed to draw visual mapping of their ideas and the students that had the professor for the second year already had one semester where they did some activities using concept maps. Some students invested much time in mapping several structuring strategies before deciding for one of them. One example of this is *The video game history* project that evolved from a very simple structure (see Fig. 53) to a far more complex networked structure (see Fig. 54) in result of the presentation of Korsakow narrative structure. This structure was complex but still mostly based in direct fixed links. There were other explorations in the same level of complexity that were not published.

The student was encouraged to further explore *keywording* strategies but it turned out that he ended with a solution based in complete random selection of videos. This option was discussed as a step back in what concerns structural organization but still not rejected by the professor as it was considered very original. His navigational option was unique since it takes advantage of the embedded option in K-Films that gives the final user of the K-Film the possibility to restart the project again by clicking in a “Play Again?” button displayed at the end of each K-Film (see Fig. 56). This “out of the box” solution, although enigmatic and strange, for a regular user, it happens to make sense as the K-Film is about video games. Randomness seems to provide game like sense to the project. Several students went through this process of choosing the structure for their project presenting one and other map as they tried to provide the better and more creative solution

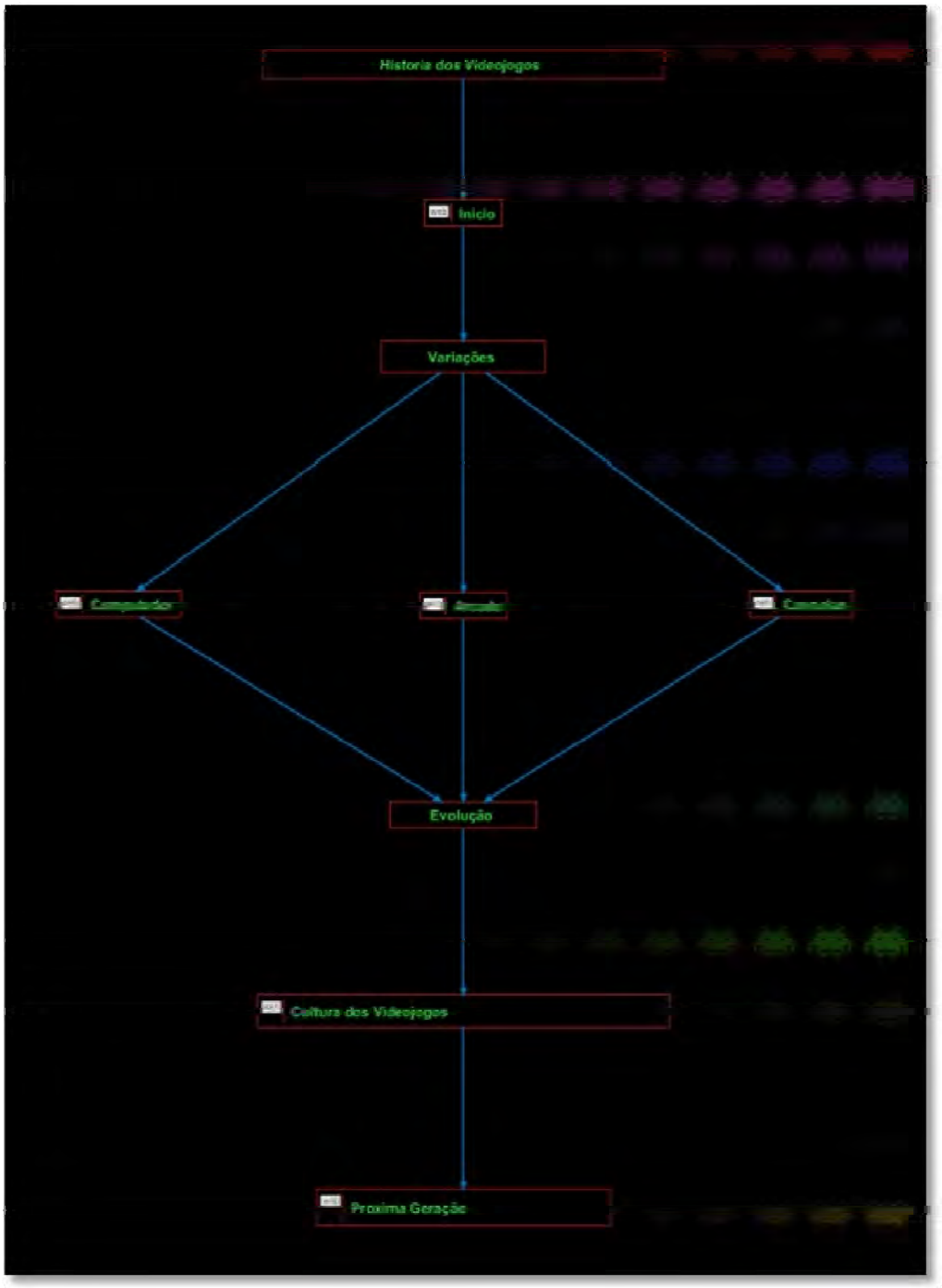


Figure 53 - Initial map developed for the project *The video game history*

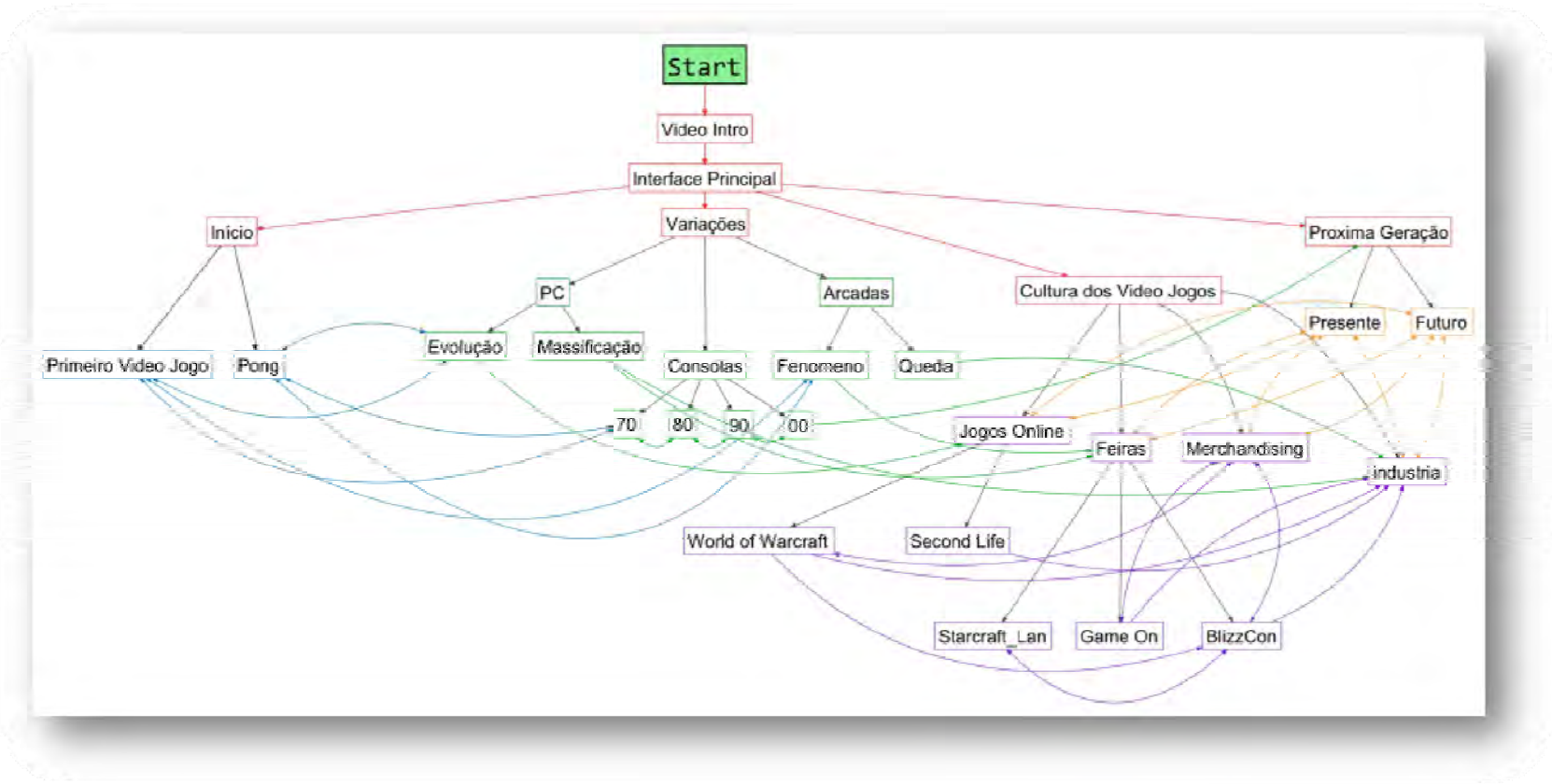


Figure 54 - Discussed map developed for the project "A história dos Videojogos" (from the class blog)

Figure 55 - Interface design is a representation of a “space invader” character in a arcade video game called *Space Invaders* (green rectangles on screen are links for the SNUs)

Figure 56 - Default "Play Again?" button displayed at the end of each K-Film

Figures 57 and 58 show the evolution of another project from the standard interface (one main screen and three previews), to a more complex one with 12 thumbnail previews surrounding the main screen. Although using semantic linking in this project the student structured the project according to a fixed number of possibilities mapping all navigational possible paths (even if only developing one branch of the tree) and she was planning already to use codes in the place of keywords in order not to lose herself in the programming. The following map broke this rigid structure by providing more random options to the user. The second option was a perhaps more interesting because it provides a more unusual interface design but would only benefit from a great amount of SNUs that were not made in time for the final presentation.

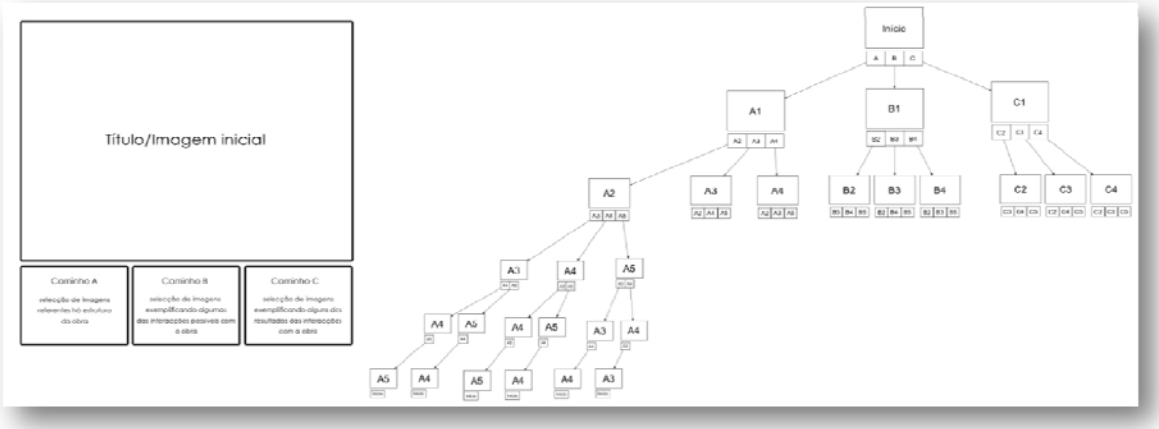


Figure 57 - Micro (in the left) and macro structure of the project “The shape of watter”.

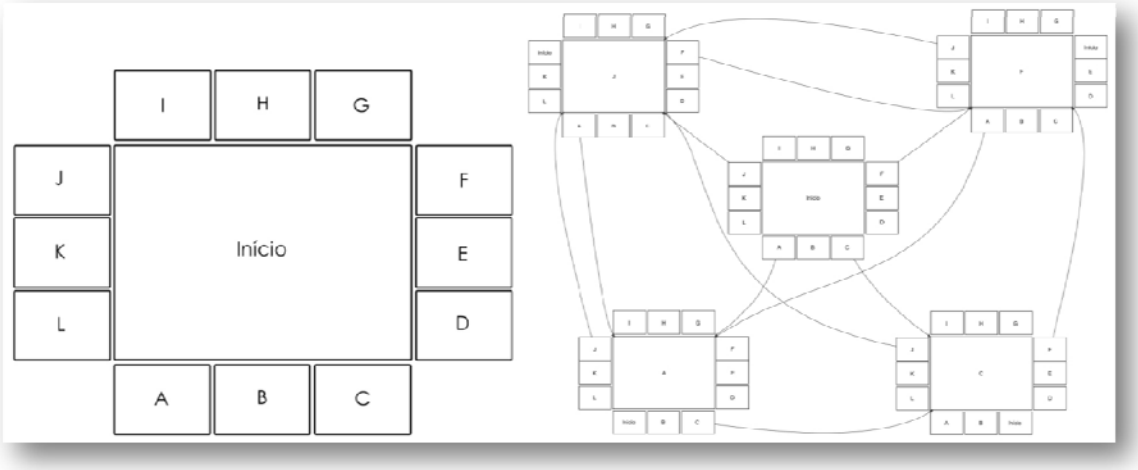


Figure 58 – Evolution of micro (in the left) and macro structure of the project "The shape of watter".

Some other students that in the beginning had projects with complete random navigation, were encouraged to think on categories for their SNUs as a way to structure their work without losing some desirable randomness

Another one with the opposite approach had a project only with fixed links and was encouraged to explore more options that could take advantage of keywords for allowing some level of randomness, but still keeping some order in the navigation. One of these examples will now be explored as a good case of semantic hypermedia coding that still allows traditional navigation providing perhaps the good of two worlds.

Semantic Hypermedia coding

The approach to semantic coding of SNUs was puzzling at first for most students as they were not expecting this kind of way for linking their media. As in last year, projects that had a fixed links structure proved to be challenging when it comes to programming it with Korsakow. Creating fixed links in Korsakow is not as simple as creating automatic links. And if one wants to use keywords it requires some careful planning. With this kind of approach students also had to understand very well how Korsakow works and their work was not penalized by their option. The hybrid project that stood out as a good example of how, from a well structured project, it is possible to create a fluid structure was inspired in another project

"Ribera de Barcarena" done in the previous year[87]. It also presented two distinct ways for user to navigate in the project: one based on fixed links and another on keyword setting. This option is a good example of Korsakow potential and deserves to be explained. The name of the project is *ZIBA* and the student's objective was to show several species of plant and animal life from a specific area of the coast, "Praia das Avencas". The semantic structure used provides options for the final user according to the category of the segment he is seeing. When all options from that category were visited the user must choose from the icons with the representation of the species. For this, the student designed an interface with icons working as fixed links for the SNUs for each species organized in the left and lower part of the screen. This was done by zones of habitat as can be seen in figure 59 Supralitoral", "Mediolitoral" and "Infralitoral" (*Supralittoral, Interdital,* and *Sublittoral*). In the upper part of the screen there were three automatic links for species of the same habitat zone of the one showing in the main screen. The structure map developed by the student helps to understand the navigation possibilities and how he structured its keywords (see Fig. 60). To play the interactive video open annex 23 folder and click the HTML file.

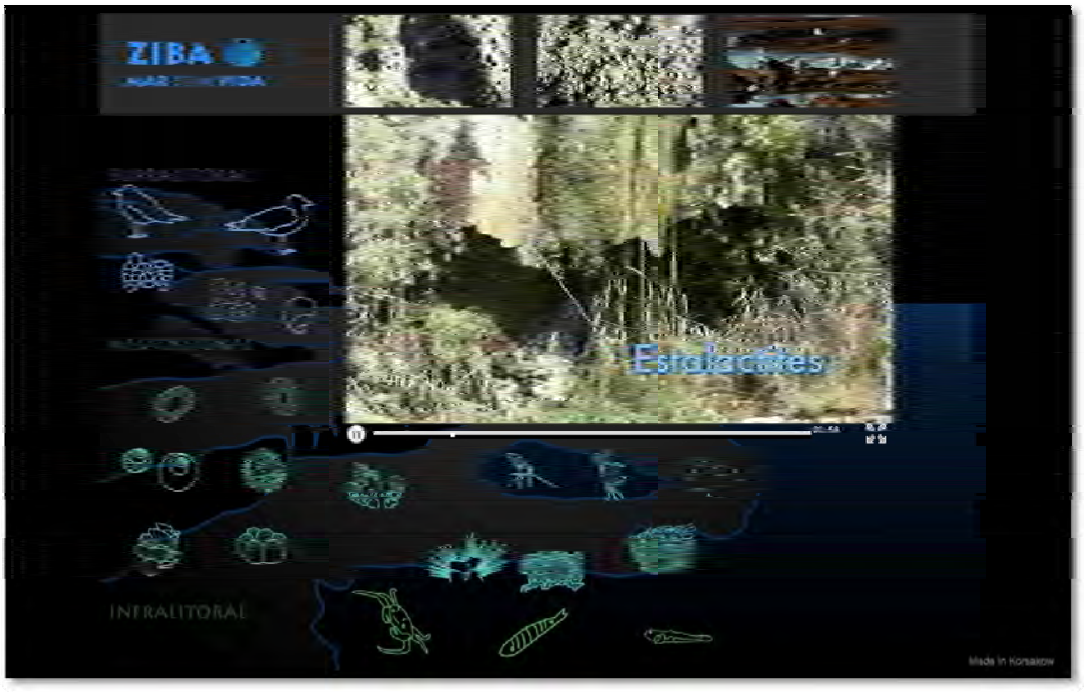


Figure 59 - Main interface of *ZIBA* interactive video (A.23 - Ziba project).

[87] Project mentioned in page 244 and page 245 with an image of the final interface design (Fig.46).

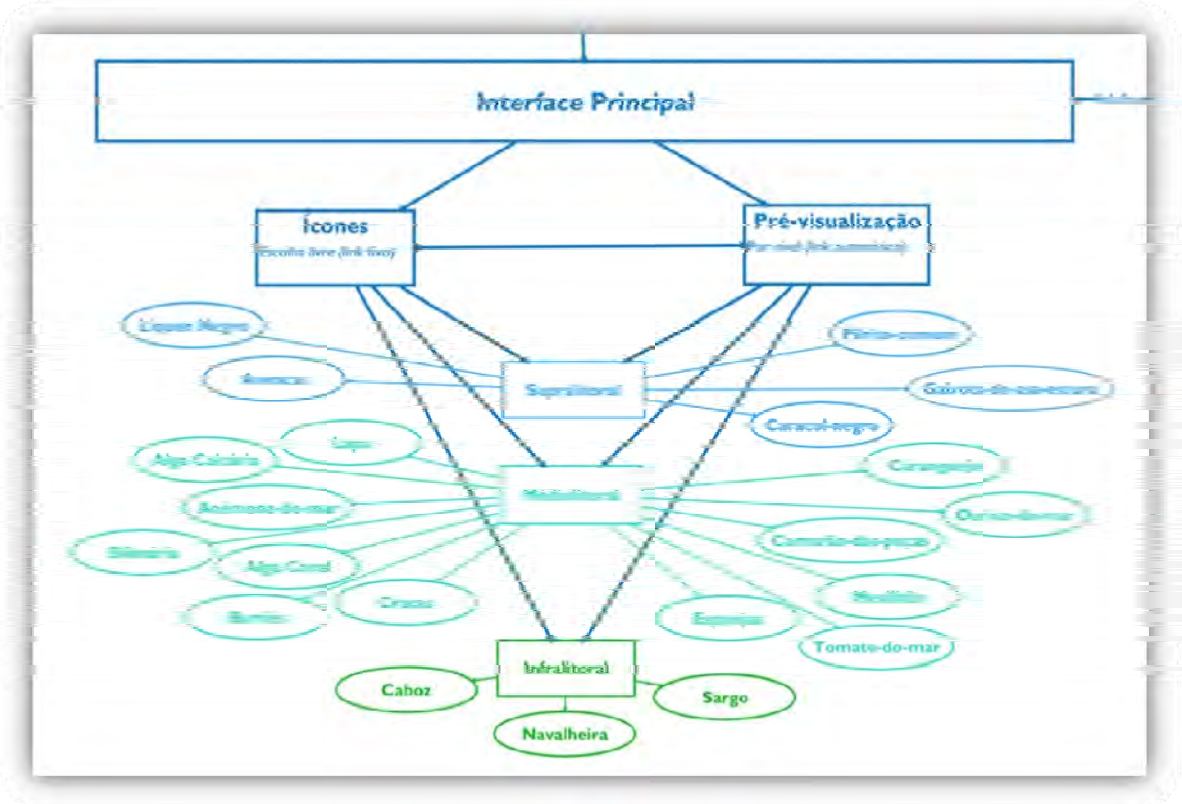
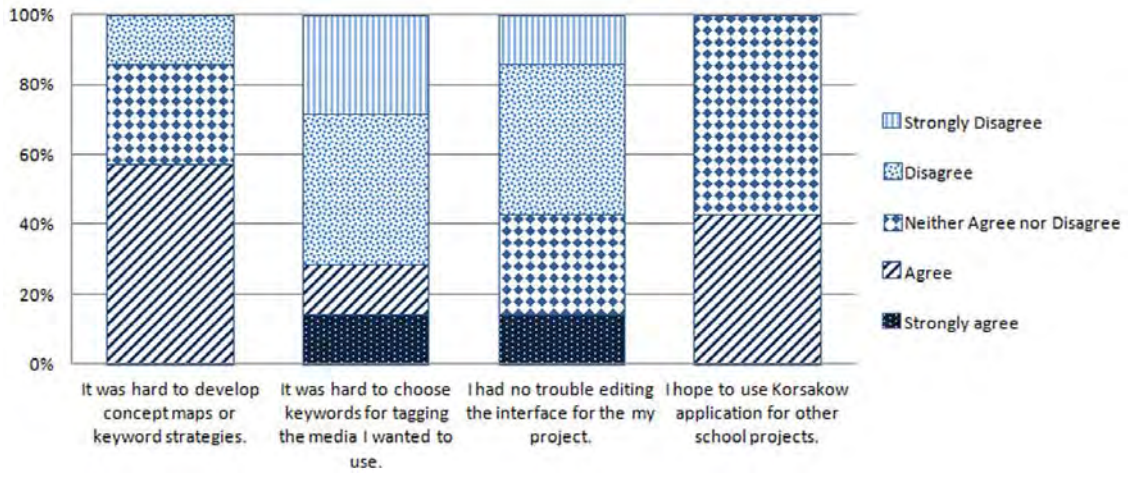


Figure 60 - Structure map of the project of *ZIBA* interactive video. It represents the setting of two navigational options to access all the SNUs distributed by three categories ("Supralitoral", "Mediolitoral" and "Infralitoral").

As in the previous projects direct discussions with students, observation of students' discussions with the teacher and the observation of the development stages it was possible to conclude that most students did manage to understand how Korsakow works. Also the professor claims that most students did manage to understand how Korsakow logic works. This conclusion is not much backed up by the questionnaire results. For instance not all students say they could understand others' keywords strategies (see Table 13). These results consistent with the previous year are probably associated with the fact that most students did not interact directly with each other's video. Also several students indicated that it was hard to develop keyword strategies and to develop the interface for their projects (Table 18). This only makes more interesting the fact that they did the projects and with better results than in the previous year. Actually the student that seems more critical of Korsakow and that indicated more problems in dealing with keywords managed to make one of the most interesting projects (the described *ZIBA* project).

Table 18 - Students level of agreement with sentences concerning the use of Korsakow and semantic structuring of media (A.19 - FQ12, Q5 and Q6).



Distributed cognition

As in the previous year, students made wide use of applications for helping the development of their projects. Although most students used *Vue* to map their K-Films structures, some used their drafts on paper next to the computer to help guiding interactivity editing Korsakow (Figure 61). Only the three students that did not use Korsakow did not practice much structuring of their media or develop *keywording* or media structuring complex strategies. But besides that, the teacher's adopted stance was the same and students practice corresponded in the same way.

Figure 61 - Student using paper drafts with interface designs and SNU mappings.

Exploratory engagement

One aspect that distinguished this second year in the U Lisbon project was the exploration of the limits of the application's possibilities. Most students felt the need to depart from what they have seen in the previous year class portfolio and further explore their options investing in the graphical appearance and in the refinement of the structures. The fact that activities with Korsakow started two weeks earlier in the semester also contributed for these explorations as students had more time for these last stages of the project. As anticipated, giving more time for students to explore Korsakow, allowed students to reconsider their projects and seemed to stimulate creativity in some students. Several students presented interface designs that revealed their creativity. One example was the "space invader" graphic display made out of the Previews (see fig. 55). Another example would be the sea star shaped Previews distribution that was considered as an earlier design for the *ZIBA* project (see Fig. 62). The student did not use it because he could not develop enough SNUs until the end of the semester.

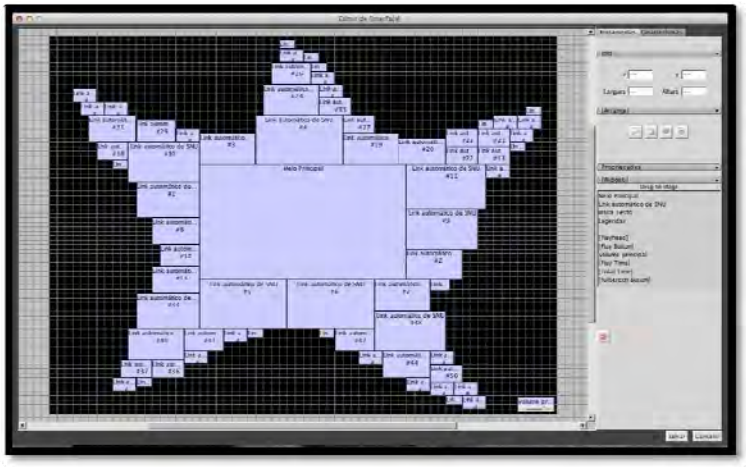


Figure 62 - Sea star interface screen capture

This exploration was done individually by most students but when they got stuck with some problem they came to the professor or to the investigator. In this year the teacher and also the investigator fully assumed the role of coaches. But if one student had a problem similar to another one that had already overcome it, the professor would encourage him to seek the help of the student that had already dealt with the problem. In this manner she was available to take care of other students' problems eventually more complex (A.18 – PFI12, Q24).

Confronted sometimes with complex demands and limitations of the application the

professor and the investigator tried to encourage further exploration of alternative possibilities. This search for alternatives promoted further explorations of the application. New ideas and not so obvious features of the application worked out for some projects but some advanced features brought even more problems to some projects. Most students in the questionnaire (71%) believe that they are able to create interactive videos on their own and one student said that she easily adapted to Korsakow.

The group that developed a Korsakow project included the student that reported to have few computer skills. The student also had more resistance to engage in the exploration of Korsakow and after two weeks had never tried to use it. The student was then asked to make one participant observation session so the investigator could see what would be the reaction and performance. When the observation was made it was already the third week after the Korsakow presentation and the student still had never tried to use it. In this observation session he showed lots of difficulties taking in average twice the time than other students. He made several bad options that resulted in errors and needed guidance to solve all of them. This observation helped to understand that students with more experience with other software deal better with Korsakow as they are more used to explore interfaces and they are more aware of some of the interface standards that Korsakow complies to.

Internet usage as media provider

Collective intelligence

As already mentioned some students were quick to understand the limitations of Korsakow and worked their way to challenge its limits. Problems and bugs that students found made some of them explore the Korsakow's tips and tricks page and online forums.

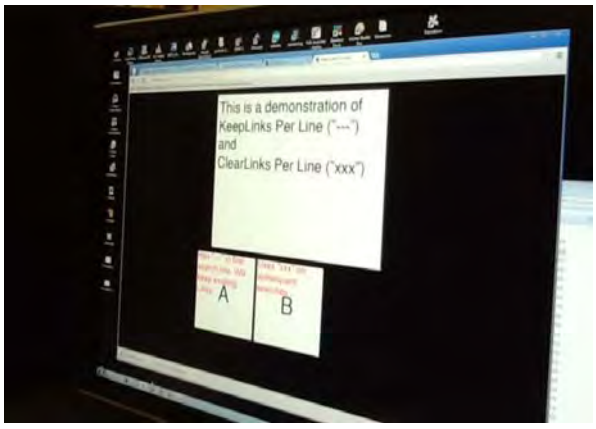


Figure 63 - Student going through an online tutorial for fixed links setting.

It seems some students got frustrated as they could not find the solution for what they wanted to do online. The professor encouraged them to report their problems to the developers and she gave the example with one of those problems (concerning the drag-and-drop fixed link interface issue described earlier). After searching herself about the problem in the online manuals and in forums to be sure there was no apparent resolution for the problem, she e-mailed the developers. After receiving a clarifying reply she presented it to students. Some days later one student followed the example e-mailing the developers after concluding that there was no online information to do what she wanted. It was in fact a great idea: to create a *video mixing* solution combining background sound and the sound of the Previews on *mouseover*. The student was surprised with the readiness of the developers. A few hours after the e-mail there was a first answer by the main developer (Dave Reisch) and a few hours later from the creator of the application (Florian Thalhofer) and the project director (Matt Soar). They seem to find her question interesting and the idea original. In the day after, the programmer replied saying there was a beta version that she could try. The student did try it and it worked out. This was a good example of how one should work his way using available resources and benefit from others involvement in collective problems.

Appropriation

In this semester the use of other works as reference and the use of other materials to integrate and remix ideas and content, was widely explored. In the blog, just in the initial exploration students made reference and links to 78 external web pages. This included videos, other interactive projects and literature about the theme and techniques for production of their own projects. As already mentioned this was considered also as a kind of responsible and legitimate appropriation that as we have seen benefited most students of this class.

Downloading online media was not new for all students that participated in the focus group. All students seemed to have the technical skills to download music or video from *YouTube* providing several alternative ways (e.g. plug-in in the *Firefox*[88], *keepvid*, etc.).

[88] *Easy YouTube Video Downloader* (https://addons.mozilla.org/pt-PT/firefox/addon/easy-youtube-video-download)

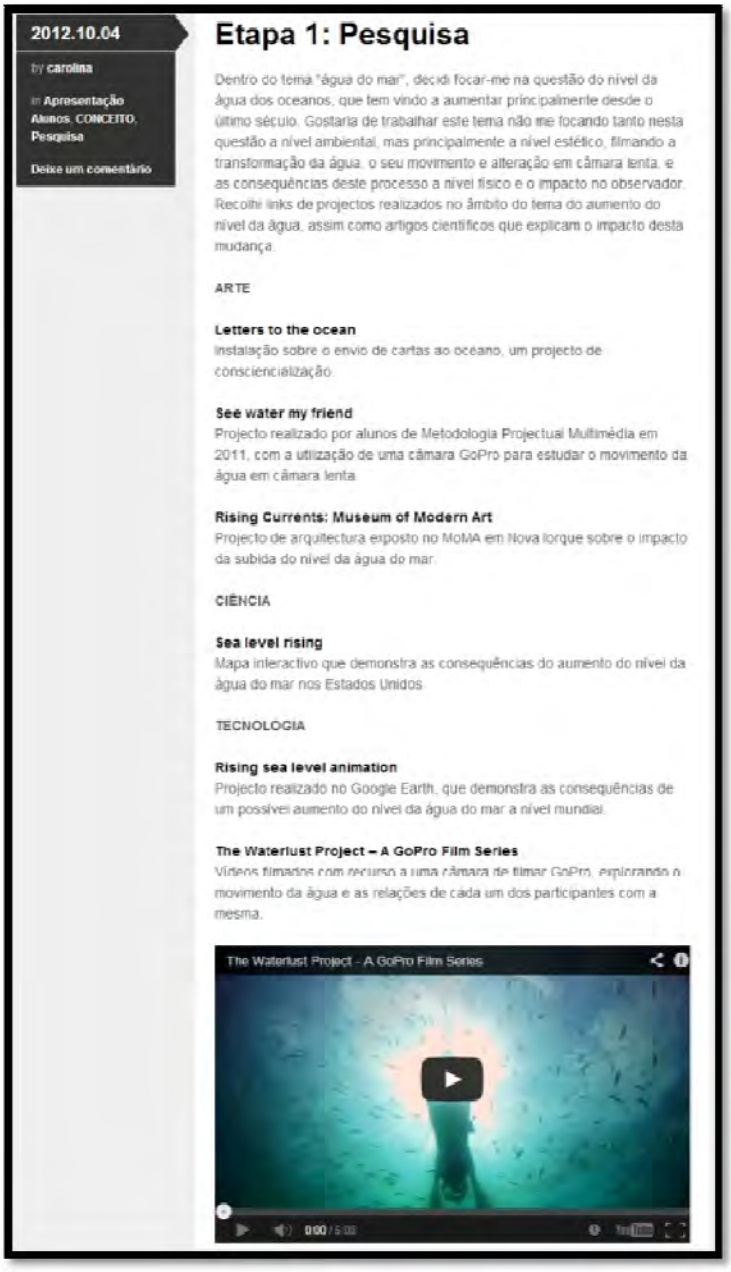


Figure 64 - Example of blog post for S*tage 1* with 6 commented external links and an embedded *YouTube* video (in this page bold lines are external links)

In this year there were three students that made their projects entirely out of videos from *YouTube*:

1. One of these projects collected several videos that reported water shortage throughout the world and other videos that showed situations where the water has destructive force as in floods. This project was interesting as one possible combination would be to switch from one extreme condition in the main screen

to the opposite on the Previews. Unfortunately this was one interactive video that was not completed on time and has a lot less videos than what would be interesting (only 6).

2. A second project that would benefit from the gathering of more materials was one that explored strange forms certain liquids can get when subjected to sound frequencies. If there were more SNUs the user could have a better feeling of an evolution in the elaboration of forms that can be made with these experiments.
3. The already mentioned project about video games was also made using videos from *YouTube*. It had 19 SNUs that made it considerably more interesting than the previous two.

The students from these last two projects presented their references in the blog and in their presentations to class and made needed editorial decisions to keep the SNUs short. Although presenting their references in the blog most students did not include credits information with the videos or sound used in the K-Film but some justified it as they were only using small clips and their projects were visibly not for profit and merely academic. One student that used a music track for the initial SNU of his project decided to make a credits sequence where the track's credits were shown.

Judgment

Following the same trend of previous year students, there was no one trusting online content when they replied to the initial questionnaire. No student agreed to the sentence "I believe most things I read/watch online" and the majority disagreed with it (60%) (A.14 - IQ12 – Q11 – Item 8 and 9).

In the focus group most students also showed awareness and concerning with the level of trust to have in online information. One student told the story of how she was almost robbed in an internet scam. And she told the lesson she learned about suspicious mails: "always check online because most scams are explained in the internet". The story was long and the lesson was not new for most students, but all seemed interested to hear one case in first hand. Also following last year results, by the end of the semester the majority of students replied they could find ways to verify the quality and validity of the references and materials they used (5 out of 8) (A.19 - FQ12, Q4 – Item 3).

Online communication and collaboration

This year students made much more use of the internet to communicate with the teacher or between themselves. Most students that replied to the questionnaire agreed that the internet was useful to change information with peers (75%) and considered that the communication with the professor was appropriated (88%) (A.19 - FQ12, Q4 – Item 2 and 5).

Networking

As mentioned in the class description most students were already regular internet users and some already had their own blogs or portfolios. For these students networking in class was natural and a welcome activity.

Some students were aware of good network practices but for some it was the first time they were actually publishing. The first post was made in class and then the teacher asked for students to comply with a list of requirements to standardize this initial presentation post. For the next posts the teacher made clear what to publish and how to publish. By the end of *Phase I* everybody had published at least twice.

Participation in the blog this year was higher as students posted 81 posts and made 36 comments to each other's posts. Taking into account that from the 15 students enrolled in the blog two of them did not follow the course until the end and one of them only posted once and the other only three times there will be counted 13 students. The average number of posts per student was then of 6 posts and 2,8 comments per student. Posts and comments were rich in information and full of multimedia content. In the presentation of initial ideas stage, the whole class shared 80 videos and many links, pictures and drawings. The professor was satisfied with the participation in the blog but she wanted students to make more comments and to be more critical of each others' work. She noticed that comments were mainly positive and that students did not use them to make suggestions. Contributing to this increase in quality and quantity (more than doubling the amount of post and comments per students) was the fact that the professor increased the number of needed posts for each phase. As the previous year students would have a penalty in the final course grade of 0,5 points (in 20) if they miss any of the five posts they were expected to publish (A.18 - PFI12, P36). But this alone does not seems to justify at least 15 post that were published in addition to the required ones and neither the increase in comments. One

further contribution for students to participate probably came from the links and blog examples the teacher showed in class in the beginning of the semester:

- The previous year class blog;
- The showcase of projects related to water called "Water Bodies";
- The showcase web page of K-Films (http://korsakow.org/vernissage/).

After the first stage the teacher also posted a link for Adrian Miles's media class (http://vogmae.net.au/classworks/2012.html) as another example of a collective presentation of interactive projects made with Korsakow by undergraduates.

The quality of the posts benefited from a precise description of what students were expected to post and how they should do it. Also if students did not comply with the main requirements they would have comments from the professor pointing out what was missing.

The last stage itself was dedicated to social networking. The requested assignment was for students to extend the visibility of their projects by publishing in other blogs or web pages their final presentation that were already published in the blog or the *Cargo Collective* webpage. At the start there was some resistance but the majority of students finally presented their announcements online. Most published on their *Facebook* wall but several did publish in more visible places. There were three that posted in their personal blogs and portfolio web pages, there were two posting in their *YouTube* channel and two other that announced their project in other blogs or *Facebook* communities where their project could have a specific interested audience. Although this was an advancement considering the work done in the previous year, the teacher wanted them to be bolder and advertise in communities with even more visibility (A.18 - PFI12, P51).

Negotiation

In this year considerable support was observed between students. Although there were only few online comments on each others' projects, students helped each others' and evolved their ideas discussing them in class.

> *"[In class] it was ended more mutual help and inspiration than competition" (Professor, A.18 - PFI12, P33)*

The professor pointed out that for this collaborative attitude between students

contributed the approach to their doubts and questions. Each student that would present a problem that another already had overcome she would forward him to meet him and learn from his experience. Also she felt that competition was not an issue in class as projects were a lot distinct not only in their theme but in their approach. Although cultural backgrounds were diverse, and it could be noticed in some students options, it was felt that students valued each others' work respecting their approaches to the subjects they chose.

5.6.4. Discussed ideas for the learning model

One more stage for exploring the user experience

User experience is a fundamental part of every design project and it was addressed in several occasions in the class. For example the teacher explained at least to one student how to make a prototype with paper advising him to test it with friends not acquainted with his project. This is an easy way to make a user experience test before investing too much in the development of the digital interface. Although user experience was discussed in class the professor believes that the importance of having users involved in the project should have more relevance. Therefore she suggested that next year it would be an improvement to make this one further stage with a corresponding presentation of results (A.18 - PFI12, P50). In the teacher's view this stage could also be the opportunity to include the earlier discussed idea of a commenting session in a similar way of what was done in UT Austin. The professor would also want each student to play other's interactive projects and take written notes with comments in a sheet of paper or eventually in a shared *Google doc* (A.18 - PFI12, P58 and P59). This would also be a good opportunity to make user experience tests.

Korsakow explained earlier in the semester

The idea of having semantic hypermedia explained earlier in the semester was expressed by two students in the final comments of the last questionnaire as they would have adapted their project to Korsakow possibilities earlier instead of exploring other less interesting ideas.

> *"[I suggest] the limitations of the software should be better defined from the beginning, so that the ideas may be framed in that setting." (A.19, Q9)*

> *"[I suggest] more time to work with [the] program before developing a project" (A.19, Q9)*

The problem felt by these students was also felt by others. When students are asked to think about an interactive non-linear project the most common idea will be a tree-like structure. This kind of structure can be easily done with simple HTML and the idea with this project was in fact to have students thinking in alternatives to that. Naturally, students that had already used conventional HTML editors and wanted to developed project with tree-like structures found that the application could be easier to use.

5.7. Summary

As expected the project developed in FBAUL benefited a lot from the experience gathered in the UT Austin project. Several important conclusions concerning the models' application were here presented and some ideas for developing it could be considered when defining the final setting of activities with the professor. The project also benefited from being developed in two editions. The opportunity for a second iteration complemented and enriched the results of the study and it was also an opportunity to improve students' learning experience benefiting from the earlier conclusions of the first edition.

The project followed the same methodology and used the same prepared tools for evaluation as in UT Austin. Although students were not so participative in leaving written comments the amount of students involved allowed collecting considerable more data than what was collected in UT Austin.

Some conclusions would eventually be obtained from the implementation of any other teaching learning model, for example the idea that more time and less amount of students for one professor increases students' outcomes and makes the whole implementation of activities and research study much easier. It is reasonable to expect that having fewer students in class allows the work to be done in much close proximity to students and allows a richer and personalized observation of students' evolution in their projects. Collaborative and cooperative work decreased significantly as most projects in the second edition were made individually but it was interesting to observe that even so, students would support and help each other in class.

Also as in UT Austin earlier discussions with the professor and the interviews were very useful in order to adjust the implementation of the project and to enrich the project

with new ideas. The main set of proposed activities was developed as well as in Austin supporting the development of essentially the same set of skills. Nevertheless some results lead to conclude that some differences in the approach of some activities contributed to provide better results in some particular skills. For example, showing students a greater amount of projects made with Korsakow in an academic framework seem to have influenced students to further explore advanced features of the application and develop more elaborate semantic hypermedia structuring for their K-Films. Peer-to-peer support was also noticed to promote a good environment in class and supported daring choices that promoted creativity and unexpected evolutions in some projects.

Although the learning environment and participants varied in all the iterations of the research study there are several issues that can be compared and related. Several conclusions drawn from this last project make sense and are complemented taking into account results and conclusions addressed in the initial project developed in UT Austin. Following this idea the next chapter is dedicated to present and discuss the conclusions from both projects and setting some recommendations for future implementations of the teaching-learning model.

Chapter VI

6. Projects' conclusions

The diversity of the experiences done in two specific learning scenarios and with different students and professors demands some organizing of the overall conclusions arising from the projects. This chapter intends to do this and at the same time provide a direct approach to the research questions proposed in this thesis.

A general conclusion is that both projects were successfully implemented and provided rich experiences for participants involved. The set of implemented activities resulted positively for professors and students that participated in the study. Most students understood semantic hypermedia structuring to a satisfactory level and defined (or redefined) their projects in order to explore Korsakow potential. For some students that developed less complex K-Films, the activities were still a success as even in these cases most learning objectives were achieved and students were engaged in meaningful activities that contributed to expand their knowledge and improve their attitudes and skills toward online multimedia production.

The learning model proved its adaptability and efficiency to support the development of the attitudes and skills described in the pedagogic objectives of the teaching-learning model. In this chapter results are summarized along the three first sections.

As we have seen in the last two chapters the proposed learning model was adopted by the professors with some adaptation of their own. Table 19 summarizes most relevant adaptations or deviations to the initial model (presented earlier in the section 3.2. the research project design) which was discussed with the professors.

Table 19 - Most relevant adaptation done in each project to the proposed learning activities

Initial model proposed activities	**Adaptations implemented in UT Austin** (2011)	**Adaptations implemented in ULisbon**	
		1st Edition (2011)	2nd Edition (2012)
Definition of theme or topics to be addressed in the project (students have some liberty of choice)	Students had a common theme (*Myself*), a set of mandatory topics were demanded but students could define further topics	There was a broad theme (*water*) but students had much liberty in how to approach it	There was a broad theme (*water*) but students could present other themes and had much liberty in how to approach them
Search of online materials for inclusion in the project	Only one mandatory topic needed to contain online materials	Projects could be done without online materials but references were mandatory	Projects could be done without online materials but references were mandatory
Structuring project's concept/keyword mapping	Project's structure definition suggested but not required	Students used concept maps extensively	Students used concept maps extensively
Editing short videos and structuring them in Korsakow	Video duration limited to 30 seconds	No video duration limit (1 minute duration was suggested)	No video duration limit (1 minute duration was suggested)
Presentation and discussion of students' interactive videos	There was only one screening of a student's project draft but students shared their projects in class for collective discussion and written short reviews	Interactive videos were presented and discussed in class	Interactive videos were presented and discussed in class
Online discussion of projects' development	Online discussion was almost non existing and mostly from professor to students	Online discussion was scarce (with less than one comment per student on average and almost no direct responses)	Online discussion was moderate (with about three comments per student on average and some direct responses)

The first two sections of this chapter will be addressing the influence in these projects of direct use of the internet to complement the interactive video production and the third will focus the skills and attitudes arising from the use of semantic hypermedia.

Most objectives seem to be fully achieved by all students and contribute to the success of this project. Nevertheless some developments could prove to be valuable in

order to extend the reach of some activities and to provide more support for all students to fully achieve all desired objectives. These developments will be presented in the last two sections beginning by addressing software developments and improvements and ending with some ideas for the development of future teaching and learning settings.

6.1 The use of the internet as a source of media and information

As part of their daily routines and habits, students welcome the opportunity to use and discuss the internet in their academic life. For example the focus group discussion went very well since the first minute, as starting the conversation by asking their learning experience with *YouTube* helps to set an informal mood much comfortable for students to speak of their personal experience. Meeting students in common ground for discussion made it easier to introduce the theme of learning with the internet.

The way the activities were proposed resulted in an intensive use of the internet. Four different activities are in the center of developed attitudes and skills that were supported as part of class objectives:

- Students searched for references to frame or illustrate the project approach they wanted to follow;
- Students searched online for media to include in their own projects;
- Students searched for references to validate the approach they took and the media they used;
- Students searched the internet for technical information on how to edit their videos and to edit interactivity.

These activities were developed with much intensity and with certain concerns regarding addressed topics in class (for instance ethical issues and critical judgment). In this way knowledge acquired concerning web awareness and avoidable risks were put in action when using or downloading media and applications. Students were not considered as mere "receivers" of information. As Hill et al. (2004) point out, in activities where the internet is used to provide information there are still some variables that can make the learner more active in the learning process. As mentioned, students don't need to be creating their

resources however they "do need to be actively engaged in evaluating the viability and reliability of the resource" (ibid., 2004). Interpretation and the process of online search is also supported by Hill and Hannafin (1997) as part of complex active process that include the activation of prior knowledge and metacognition considered fundamental for knowledge construction. Attitudes improvement revealed that most students were more:

- Confident in using online resources;
- Informed about how to use online materials in diverse contexts;
- Confident in choosing which applications to use;
- Confident in choosing sources of information.

Skills developed in the process:

- Ability to select and use online content purposefully and ethically;
- Ways to find online tutoring or advice for production;
- Capacity to choose applications to install in their computers;
- Capacity to identify consequences of using different video formats for the web.

It seems clear that the demonstrated intense use of the internet in the development of their projects contributed to change student's perception of the internet and made students see the internet more as a place to learn than merely for entertainment.

Presenting examples of renowned artists in different formats proved to be inspiring for some students. As described by Bandura (1977) it seems that following role models provides students with a reference for action and supports motivation. It seems however that the closer examples are to possible responses to the project challenge the better are students' attitudes. Examples of projects made in similar context of media production (e.g. K-Films done in courses by other students) proved to inspire students the most while examples done in different contexts (e.g. examples done by some artists) seem to have less effect. This conclusion is consistent with most widely recognized works from authors supporting the use of the internet for knowledge networking. Interaction with the work of peers and experts within learning communities sharing the same interests does seem to provide support for learning (Wenger, 1998; Harasim et al., 1995).

6.2 The use of the internet as social networking environment

Knowing how to use the internet as a source of media and as a source of information requires some knowledge of how it works as a social environment. Students developed the sense that what they find online is mostly created by people and for people, and that people are socially integrated in a whole system in which the internet is just a part of. For example trustworthy content mostly comes from trustworthy communities or are supported by them. Trustworthy communities can be generated online or can be associated with known institutions with presence and reputation outside the internet. These notions are considered of great relevance for authors and practitioners supporting contextualized learning environments that integrate the learning experience in real-world situations (Wenger, 1998; Siemens, 2006).

The notion of oneself as a participator in the internet as being a social environment is also crutial for the process of creating or enhancing their own online presence. This notion seems to have contributed for student's investment in their work and in the way they publish it along the learning activity. This progression was much noticed when students all shared the same blog (in U Lisbon) enhancing somehow their notion of their posts' visibility within a community. This general conclusion is central to most advocates of *2.0 Learning* models that advocate participatory pedagogies making use of as much *Web 2.0* and technologies in education as possible (McLoughlin & Lee, 2011; Downes, 2007).

As McLoughlin & Lee (2011) verify that simple social software tools as the web blog have been proven successful in "teaching composition" or used as a "reflective writing tool, as a platform for housing e-portfolios, and to facilitate shared and guided exploration" in many schools and universities (p.44). Dawson (2008) is confident to support computer mediated communication in many educational scenarios. He notices that in asynchronous CMC students are able to reflect on postings and access additional resources before contributing to the discussion facilitating the development of higher order learning outcomes. He points that having discussions and contributions available for later review contributes to strengthen social relations and further extend or review positions.

The importance of the internet as a communication medium in the context of the projects development was considered important as it facilitated the change of information,

opinions, and resources between students and between students and the teacher.

Attitude improvements revealed that most students:

- Were increasingly responsible when publishing online;
- Began to value or reinforced their online visibility;
- Were more aware of the importance of open-source application communities;
- Valued social networking and online communities;
- Gave more importance to meta-information associated to content.

Skills developed in the process:

- Capacity to search information in specific networks;
- Capacity to publish online following specific standards;
- Capacity to follow social protocols for networking;
- Capacity to share information in meaningful ways.

In other words, proposed activities contributed for students to develop a more effective, conscious, responsible and active online participative attitude. The set of skills and attitudes here presented were already identified by several authors in activities making use of blogs and other *Web 2.0* applications:

> *"Within the structure of a blog, students can demonstrate critical thinking, take creative risks, and make sophisticated use of language and design elements. In doing so, the students acquire creative, critical, communicative, and collaborative skills that may be useful to them in both scholarly and professional contexts." (Duffy & Bruns, 2006, np)*

> *"[B]logs are very useful to document your practice, to encourage and support reflective and process based learning, to nurture peer support and learning, to provide a record of achievement, in assisting idea creation, supporting collaboration, and finally in developing multiliteracies that allow participation within contemporary information ecologies as creators, rather than being limited to being passive consumers." (Miles, 2006, p. 189)*

In UT Austin the used LMS also contributed to make easy a relevant part of communication as it was used at least once a week for announcements send by e-mail and also as a place for the professor to share some supplemental references, digital materials and links to other sites. In U Lisbon although there was no LMS used, the collective blog

had the same kind of information and materials available to everyone. The online component of the course was open and in this way consistent with a more participative attitude required to students.

Blogging activity developed in all iterations was the main opportunity for students to develop most networking skills. Although present in all iterations it was in the last one that more students got to have more contact with blogs developed by students and online learning communities. Blogs that were visited by students included diverse learning communities dispersed geographically but sharing same interests (e.g. Adrian Miles classes blogs, in Australia).

As assumed in UT Austin by the professor the blog was mainly used in a direct replacement of earlier non digital activity like the homework notebook. The technology is new but there was no substantial difference in terms of practice. This can be identified as what Lankshear and Knobel (2006) named the "old wine in new bottles" syndrome where computers provide a new media to develop old practices. Miles however believes that to some extent students are well aware of the fact that a blog is public and is then written with the assumption that it has readers.

> *"The number of readers does not matter, the point is that what you write (the student) about needs to be written in such a way that it makes sense for other readers, so requires more care, elucidation and clarification than may be the case in the personal diary or even journal writing. This publicness means that care needs to be exercised…" (Miles, 2006, p.189)*

Blogging for most students seemed to be a natural activity where they were self-motivated. Most students in UT Austin wrote considerably more than what was requested and posts seemed to work as memory aids, keeping notes about their readings and research and for keeping record of their own work. Although in the questionnaires most students don't report changes in what concerns blogging activity before and after this intervention much participation was noticed in both iterations and several students seem to become more careful in their participation. In U Lisbon the blog was not so self-centered and the nature of post was also more oriented toward showing each project progression and project planning. Minocha and Kerawalla (2011) also report from their study with university students several benefits associated with this usage of blogs. They concluded that blogging

activities promoted self-motivation and resulted in students' development of study and research skills. In their study they claim blogging activity supported time management, academic writing and effective communication.

In U Lisbon the blog function was used in a considerably different way. Students published all in the same blog and therefore posts were shared in a collective way with the initial idea that everybody could appreciate and discuss each other's work. The idea was to have students' participating and contributing with comments in order to decentralize the professor as the authority in the evaluation and commenting process. This was achieved to some extent. Even with only moderate commenting activity in the blog, there was much in-class activity that made use of the blog to contextualize discussion. The blog was often projected on screen and students were directly requested to have something to say on each other's posts.

Lankshear and Knobel (2006) stress that computers (as a medium in education) are often limited contributions as they are often seen as a mean to have "neat final copies" for students to present their work. In this work this tendency was opposed and the truth is that blogs in all iterations were not assumed to be a place to have neat final versions of students work. In fact students often published hand drawn maps and wrote in conversational ways. Blogs in fact and many online environments (e.g. forums, chats) are not associated with the typical textual print formats. They have some rules but are considered to be more fluid and closer to a new form of orality than to a print formal format. As earlier discussed by Ong (1982) "a new age of secondary orality" is rising after an electronic transformation of a verbal form of expression much influenced by the extensive use of the printed media but that now escapes local proportions to assume global ones. Online publishing has its own specificity and as stressed by many authors blogging can be of great use to introduce students to these new formats that now increasingly contribute to networked ways of meaning production (e.g. Jenkins et al, 2009; Lankshear and Knobel, 2006; Duffy & Bruns, 2006; Minocha & Kerawalla, 2011). This new orality presented by Ong (1982) where spontaneity has gain a new status of "being a good thing" is also supported by Miles (2012) in his courses in what concerns media production in general.

In UT Austin blogging activity varied a lot from student to student. This may be

associated with a secondary role it had for the professor. Although the blog in the syllabus counted as 20% of the class grading most assignments were not taking specific advantage from the medium. The major advantage recognized by the professor was the ability to have video prompts that are impossible in print versions of notebooks. Miles (2006) supports that to use blogs in an effective way in education blog activities must be integrated in the class work and have relevance on their own. He presents strategies to support that include teaching specific basic tasks associated with the medium (e.g. creating external links customizing the blog design, managing categories). This type of investment was absent from most of the student's blogs in UT Austin. However in U Lisbon project the investment in these aspects was significant. The blog benefited from contributions of most students and the professor encouraged the use of rich media, online references and the collective management of categories that most students started using contributing for the blogs to be experienced as class portfolios.

Blog activity was successful in all iterations as a medium where students had to develop a range of literacies related to online publishing and writing using different ways of sharing media (e.g. using digital photos, audio, and video). As Miles (2006) also noted in his experience of using blogs in class simple but essential questions about copyright, intellectual property, and internet ethics are exercised while using blogs.

> *"Blogs provide access to much of this in ways that complement and make concrete what might otherwise appear as abstract or distant concerns." (ibid., p.192)*

Jason Ohler (2007) found in his classes that the use of blogs and social networks greatly combines with creating stories:

> *"That's when another revelation hit me:"learning communities are primarily storytelling communities. Stories permeate our social fabric and have the primary function of teaching others, whether formally or informally." (Ohler, 2007, p.6)*

6.3 The use of semantic hypermedia as a cognitive tool

Semantic hypermedia production includes itself in a broader category of activities for production of multimedia that stimulates students to think about interactivity, non-linear structuring of information and computer interface design. Most students engaged in

reflexive and mindful activity while developing their projects considering:

- Their target as users instead of audiences;
- The users as active participants and not merely passive;
- The management of user engagement and interest required for good interactive experiences;
- The way in which the project will be experienced.

Many authors claim that using multimedia provides students' with many opportunities to develop these attitudes. They support digital storytelling and the use of diverse media formats and diverse media contents in many learning contexts and levels of students' development (Mayer, 2010; Müller et al., 2010; McLellan, 2007; Ohler, 2007). Many authors claim these attitudes to be more important than many technical skills and reinforce the cognitive effects of using this kind of approaches to support learning in diverse subjects (Beichner, 1994; Chambel et al, 2006).

> *"Story's structure and rhythm, as well as the emotional involvement it encourages, can help us remember important information that might be forgotten if it's delivered to us in the form of reports, lectures, or isolated bits of information.(…) Digital stories allow today's students to pursue academic content in their own language." (Ohler, 2007, pp. 9,10)*

Researchers and practitioners using this kind of approach support the idea that by requiring students, as editors, to select from a wide range of materials only those bits of multimedia information that they judge appropriate for their audience, they are encouraged to thoroughly evaluate the importance and relevancy of the content material. This approach supported by many authors already addressed (e.g. Miles, 2009; Reed, 2009; Mayer, 2009; Moreno & Valdez, 2005; Jonassen & Reeves, 1996) builds in the idea suggested by Perkins (1984) that for effective learning teachers and students should "design knowledge".

However this project intended to explore a specific technology contribution. Students were asked to manage concepts and keywords associated to their multimedia projects in a semantic fluid way but also considering sequential narrative associated to it exploring the specific storytelling engine provided by Korsakow. The main conclusion regarding this particular effort is that it requires students to think about:

- Which concepts to relate to the project's main subject;

- Which set of keywords can be associated with addressed concepts;
- Which sequential relation concepts may have to better present them;
- How to communicate through processes rather than sequences.

The process of elaborating semantic networks representations both in paper, using suggested software and finally structuring material in Korsakow was not easy to most students but most collected data suggests that most students evolved in developing notions and skills associated with dealing with this complex information structuring process. The use of concept maps and schematic networks representations is believed to have been helpful in problem solving processes of hypermedia production. Authors as Tony Buzan (1974) highly support their use in diverse contexts. Specifically in education, authors as Guimarães et al. (2000) have applied and researched its use in *hypervideo* production verifying its pedagogical efficiency and effectiveness within flexible, rich and participatory learner-centered environments.

Full exploration of Korsakow potential was not achieved by most students but literature identifies this as recurrent problem. Analyzing several authoring applications for developing hypermedia Spierling and Szila (2009) also arrived to the conclusion that most people miss taking advantage of all the potential of any given application.

> *"Since it appears difficult to grasp the specifics of an engine, and therefore to ground any story design around the underlying computational models, some authors tended to use only a subpart of the engine's features. As a typical experience in first authoring attempts with each of our engines, an author would naturally try to reduce the functionality to a linear or branching structure, which is more intuitive." (Spierling & Szila, 2009, p.54)*

Combining the development of interactive audiovisual communication process with programmable engines associated with keywords was in fact a challenge with which most students engaged and that is believed to have provided a good environment to reflect about emerging non-traditional narrative formats. Several authors support this combination of semantics and hypermedia production in learning contexts (Gasevic et al., 2011) but most studies found are still in preliminary stages of model definition, application and research. The understanding of the importance of this reflexive effort drives from and complements the understanding of the emergence of non-traditional narrative formats and the emergence

of new types of media consumers used to new paradigms of online networking.

The field of digital interactive storytelling is still defining itself as Spierling and Szila (2009) claim:

> *"Recent discussions about the issue of authoring suggest that it is hard to clearly define what steps of creation fall within the scope of authoring, and where the boundaries of so-called authoring tools are located. This is because on one hand we assign a co-creation role to the user regarding the resulting story experience, and on the other hand we cannot precisely distinguish between authoring a dynamic storyworld and programming the engine." (p.50)*

The notion of authorship in interactive media was a great concern for both professors involved in these projects. In journalism, in documentary and in arts the levels of participation and agency become key factors in the creative process. All arts can be considered to be interactive and participatory, if one considers that viewing and interpreting a work of art are already processes of dialogue where the individual references and culture have a major impact. However as noticed by Lovejoy (2001) and Miller (2004) in interactive digital works the interface between artwork and viewer becomes a meeting point where this dialogue may assume a physical action rather than an event only in the mind. The author's role changes from one who has total control of the artwork to one who designs a structure that invites collaboration. In what concerns the artwork itself without the audience is "incomplete" (Lovejoy, 2011). The understanding of these elaborated ideas seems to make more sense to most students in the process of projecting, designing and effectively develop their ideas with the help of tools. Ultimately some of these mental processes only reached maturation, while using the semantic hypermedia application for interaction editing or, after that, when further analysing peers' work.

It was concluded that most students in the process dedicated much time to research and though to addressed subjects. This perceived increase in motivation is reported by already mentioned authors, practitioners and researchers (e.g. Ohler, 2007; García et al., 2004). Heiden et al. (2010), although not reporting more motivation or knowledge gain comparing to other more traditional academic teaching, found that soft-skills were developed associated to teamwork and project-oriented context.

Translating these reflexive actions to attitudes, it was possible to observe that some students were:

- More willing to give more control to users over the narrative path;
- More willing to share their project authorship;
- More confident in proposing alternative navigational formats;
- More open to alternatives to linear storytelling;
- More capable of engaging in open ended media projects.

It seems that the processes proposed for defining semantic hypermedia navigation supported the development the following thinking skills like:

- Synthesizing visual and audio content to core concepts (creating keywords);
- Categorizing media, setting the keywords for several media;
- Conceptualizing materials to illustrate specific keywords or to belong to a chosen category;
- "Shoe-shifting", ability to put oneself in others shoes (thinking about "what others would like to see next", "what would make more sense to others to see next").

In the process students understood the logic of managing databases of videos and became more interested in this kind of multimedia format. Students also understood that there is no need to be knowledgeable of computer languages or to have to write computer code to edit elaborate rules for controlling the dynamic creation of multimedia projects and navigation interfaces.

Authors reported with not much surprise that young students easily develop in workshops or small courses digital storytelling skills that are initially considered rather complex and demanding. Robertson and Good (2006) for instance report the importance of allowing students to tell "stories which are important to them in a medium which they value" (p.349).

Milles (2009) in his courses finds that semantic hypermedia improves students' capabilities for generating more connections between subjects and concepts. Challenging students to consider concepts taking into account rules or principles of connection, as

'family' or 'kinship' results in abstract "meta" linking where links are defined by ideas and associations rather that literal words.

> *"This produces a complex and sophisticated level of abstraction where the types of links students create changes from more or less simple navigational cues towards the authoring of links as the creation of abstract and associative patterns between nodes, which in turn encourages the creation of nodes as a consequence of link possibilities." (Miles, 2009, p.226)*

Wilson (2009) as already mentioned in chapter three claims that Korsakow application is "good to think with" in anthropology classrooms and states that "polished" and "rather complex" works were produced by his students in a one-semester course. While doing it students engage in textual production, in interface and database design and in learning the techniques and ethics of fieldwork. This work he believes supported students incorporate and value important ideas associated with earlier described metaphors of "rhizome" structures and the "parallax effect" within social context. Wilson (2009) presents in his paper two projects developed by students that show how well students understood the influence of interface design in users. Exposing Manovich idea that "... far from being a transparent window into the data inside a computer, the interface brings with it strong messages of its own" (Manovich, 2001, p.65).

6.4 Software development and improvements

It is important to remember here that in the way this research study was designed and implemented, there was not an exhaustive presentation of Korsakow. In fact, one of the objectives of the research was to see how well students adapted to Korsakow editing logic and interface and to know how versatile Korsakow would be to respond to students' ideas and demands. This approach allowed analyzing students' ability to explore and learn how to use an interface that was completely new to them.

Spierling and Szila (2009) going though many studies on the use of hypermedia authoring tools arrived to the conclusion that they lack usability and that users spend too much time with technical details. Most applications they reviewed demanded activities that mostly resembled programming requiring students entering great amounts of text. Even

applications with more graphical interfaces required entering to much data and required too much time to get to see some results of the created content.

> *"Typical problems that slowed down the processes in our examples include the lack of usable graphical interfaces supporting different perspectives on the content, the lack of control mechanism preventing authors from entering erroneous content, and the existence of several distinct files that are needed for running one storyworld, such as configuration files for various modularized elements, characters, dialogues, etc." (Spierling & Szila, 2009, p.56)*

The main conclusion is that Korsakow reveals to be an easy to learn and easy to use application. However in this research study it was possible to find several opportunities for development of the software as a tool to be used in the classroom with students. Some ideas for development were earlier discussed with other professors and were in these projects analyzed in context with students having an observer perspective. Some ideas for development were elaborated from students' and professors comments and observing their performance.

One important conclusion concerning Korsakow authoring interface is that that it successfully incorporates many design options from already existing popular applications (e.g. structure with above menu, drag and drop options). It was found that some specific task that required not so standard process demanded from students more time with trial and error situations or in some cases consulting the application online manual.

> *"Standardize and you simplify lives: everyone learns the system only once." (Norman, 2002, p. 202)*

To have standard options allows the application to be more easy to use by students that have experience with other applications and for the application to have inner coherence.

Tutorials development and translations

The basic editing features of Korsakow were easy for most students to understand on their own or with very little guidance. Yet more advanced features were difficult to sort out and required searching for solutions online. Some configurations don't seem to be addressed in the site or they are poorly addressed (e.g. setting subtitles, creating fixed links, placing titles, managing high resolution video) and therefore there are some opportunities to further complete it. For some students in U Lisbon, the language was a factor that proved

to limit their comprehension of some ways to deal with problems they encountered. Also not having a Portuguese version of the *Manual* and of the *Tips & tricks* discouraged its use and made the understanding of explanations more difficult. For students that opted in the interface to use the Portuguese language it was even more difficult to find the exact menu terms used in the tutorials. Therefore, one first suggestion would be to have the *Tutorials, FAQs, Tips & tricks* and *Manual* translated to other languages.

"Interface editor" improvements

Replacing words by icons in the "Drag to stage" box

Having icons instead of words or adding icons to the existing words in the widget box of the interface editing window would benefit the idea of objects that can be dragged. Also having the cursor changing on *mouseover* (from the arrow to the hand) is known to contribute for users to understand they are able to grab something[89].

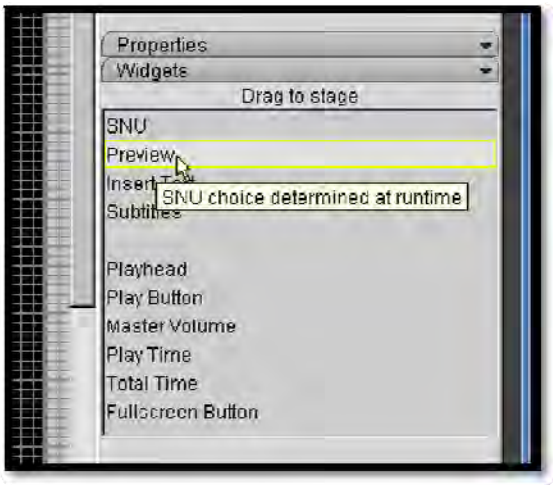


Figure 65 - Widget box in the "Interface Editor" with widget names and showing the only effect mouse over generates (an information box) and what happens on mouse click (widget background is highlighted)

Showing text sample in text boxes dragged to stage

Boxes of texts for the title of a SNU or for its subtitles don't show how characters will look like after exporting. The resolution of this issue is not easy as these boxes will show different text depending of the text defined in each SNU. Of course in the subtitles case even in the same SNU the text will change. The idea would be to create a text sample inside the boxes that would show the font size and style defined in the properties box. This

[89] Several studies present the drag and drop solution to carry more problems than benefits if not well set. Several references can be found in literature (Nielsen & Loranger, 2006) and online (e.g. – Gnome developers web page (https://developer.gnome.org/hig-book/3.5/input-mouse.html.en); Jakob Nielsen's Alert box (http://www.nngroup.com/articles/top-10-application-design-mistakes/)

would help users to have at least an idea of how it will look like for the final user and save a lot of time in adjustments.

"SNU Editor" improvements

Showing all editing options

By default, when one enters in the "SNU Editor" (in the Windows OS) the options concerning its preview are hidden. Most users exploring the interface will fail to see this possibility and will be looking for Preview options in other places. The idea here would be to make the "SNU stage"[90] smaller. This would provide more space for presenting the preview options. One alternative would be rearranging options locations to the right of the "SNU stage". This would also provide more space for making visible all options in the "SNU Editor".

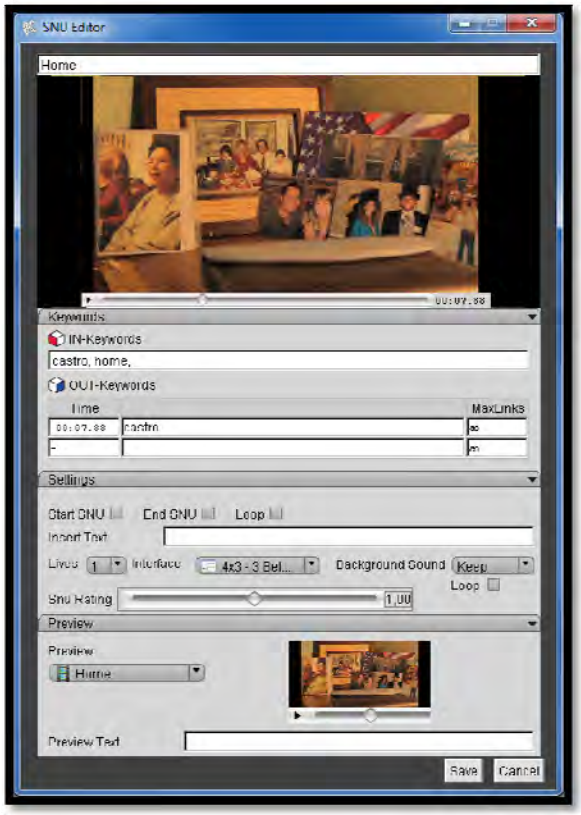


Figure 66 - "SNU Editor" layout with the SNU stage reduced and a bit of the Keywords editing box also reduced so all editing boxes (Keywords, Settings, Preview) are visible

Showing frame of the SNU whenever changing out-keyword "Time"

As described in the online *Manual*[91] one can set the time for the thumbnail Previews associated to a specific out-keyword to be summoned in the final interface in two ways.

[90] "SNU stage" is the upper part of the "SNU Editor" where the media is presented.
[91] Manual - http://korsakow.org/learn/manual/#snu_editor

One way is to change the numbers in the "Time" column at the left of the out-keywords in the out-keywords box. An alternative to this can be clicking in the "Time" column and then dragging the video scrubber in the media player. All observed students when asked to delay the time for thumbnails to appear tried to do it only by changing the numbers. Nevertheless they would be very insecure and uncertain if they were doing it the right way and would stall. Most had to be encouraged to export the project to check if it was right. Some students by chance would change the hundredth of second's numbers instead of seconds' numbers and would not see any change when they exported their projects. Having the scrubber move showing the correspondent frame in accordance with the time set in the column would make students correlate between the two ways of setting previews timing for the corresponding keywords.

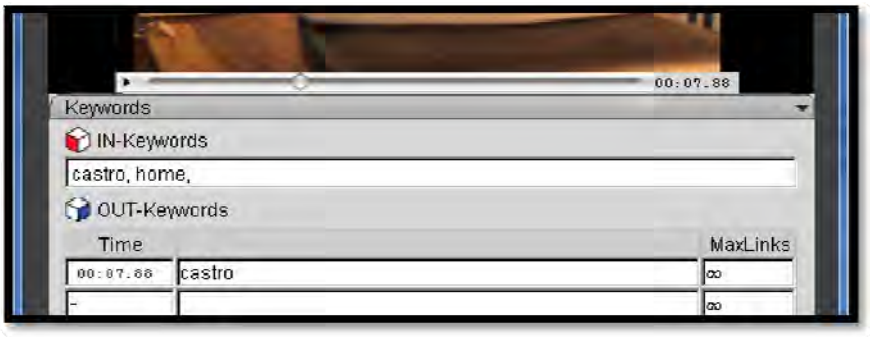


Figure 67- "Time" column indicating the same time as the play time in the end of the scrubber bar as well as the scrubber shifted to the middle of the scrubber bar.

Project development flexibility

SNU sharing possibility

The possibility to share SNUs among projects would facilitate project development with more than one person involved in the interactivity edition.

Project merging possibility

Importing and exporting whole packages of SNUs and interfaces would allow the development of bigger projects with several editors working at the same time.

Project online development

The possibility of installing Korsakow in a server would allow groups of K-Film authors to work together in the same project at the same time, with the additional advantage of having the project exported directly online with no need to upload it each time a change

is made. Many online applications also used in education, e.g. *Google apps, YouTube*, offer this features. This option is discussed by researchers developing other hypermedia tools for educational use as already identified as *HyCo* or *HYLOS*.

> *"One further work in the HyCo system is to develop a collaborative/cooperative authoring process that allows an individual mode and different coupled modes" (Garcia, 2005, p.319)*

Other hypermedia applications as *SEPIA* also took advantage of this possibility (Streitz et al., 1992) or even other projects like *VideoStore* by Nuno Correia and Diogo Cabral (2005) or *HTIMEL* by Teresa Chambel et al. (2006) that explore collective annotations over video.

Visual analyzers

User's individual path

An idea initially considered for this project, was to provide the teacher with a way to know how many students viewed each project and which path users followed in their visualization. With few lines of code it is possible to extract the log of each user and have its path registered in a XML file. However Korsakow does not have a built in tool to make this easily available. Some lines of code were tested but the implementation in a real class context would require integrating this output file with an LMS. This would make easy for the professor to visualize and identify each path with a project and a student. This idea was discussed with the two professors that considered it interesting but both preferred not to ask students to upload their works into an LMS that could integrate this option (e.g. moodle).

Keyword cloud visualization

Another idea earlier discussed with some professors but that also would require additional programming, was to create an additional way for users to visualize keywords in a cloud where most used keywords would appear with increased sizes, as in a typical tag cloud. There is no easy way to represent K-Films' keyword structure, and this on its own would be a design problem, but eventually this cloud of keywords would be more easily interpreted than the existing "All Keyword" window, provided in the editor interface. This idea was already identified and developed in other hypermedia project. For example Storyspace application used map visualization with different types of representation for some level of connections, omitted to represent others and subdivided projects in sections (Bernstein, 2002).

LOCO-Analist, is presented by Torniai et al. (2008) as a generic feedback provision tool also developed for education with this idea of helping the teacher to evaluate the student's conceptualization of the subject. As Torniai et al. (2008) put it:

> *"The assumption is that the tags that the student used for annotating the content reflect his perception (or even comprehension) of the content. The suggested visualization would also help teachers easily spot all parts of the course that the tags were used with, and thus help them reveal some of the students' misconceptions." (p.392)*

6.5 Teaching and learning activity developments

The teaching and learning model earlier described in chapter 3 was defined considering some core activities that proved their essential role in the support of students' attitudes and skills. However, it is here considered that with more class time dedicated to this project some significant changes or further assignments can be implemented contributing to enhance specific outcomes. An approach is proposed here that presents some reconfigurations and additions to the initial learning model. There is no need to implement all these presented developments. It would probably take one full semester to do that leaving very little time for other objectives the professor might have for his course. Also some developments here proposed, while emphasizing some aspects of the project, will somehow affect others. For instance, if the professor wants all students to be technically equipped to deal with the editing application, teaching all technical details of its interface and potential, he or she should not expect that students will develop much autonomy in the exploration of new interfaces.

Emphasizing design and production

In a project with the complexity associated with video production, online search, interactivity management and online publication, it is easy for students to lose focus on their objectives and disperse. This was noticed in some situations.

Small individual assignments

Asking students to develop assignments that can be done individually and in a short time allows students to focus in producing results and not dispersing in too much thinking or researching instead of doing. For instance, objectives or specific tasks in the Korsakow

can be set to be achieved in class. Tasks can be as simple as the ones proposed in the participative observation and with only four to five tasks in half an hour, students can be guided to experience both the basic and advanced features needed to develop original K-Films. Also a SNU creating activity could be set where students would have to make one short segment of video for their projects in some limited time. It could be set to be only a draft for later refinement but it should comply with the Korsakow requirements and format and be tested in the end of the activity.

User experience testing assignment

User testing is the best way for students to have a really good understanding of how their projects will be used and how well users will react to it. Several authors support it also as an important exercise in school for acquiring specific skills:

> *"Increasingly it (Usability testing) is being used for learning in schools as well as training in corporate settings. It can be a powerful tool in the hands of the performance technologist, including instructional and multimedia designers." (Lee, 1999, p.1)*

User experience testing is a relatively easy to do activity and can result in significant improvements in any project. User observation is one way of testing user experience and generally three to five observations are enough to find almost all problems that the interface might have (Dicks, 2002).

The user experience activity may be done in several stages of development of each project, from initial prototyping stages to pre-final versions. The professor can consider requesting it as an autonomous stage or including it as part of an overall evaluation of the final or pre-final version.

This activity was not made as a specific assignment in any of the iterations of this study but it was implicit in all of them. To make it a specific assignment the professor may explain the basic steps of user observation and then ask for a summary of observation notes or a report with gathered conclusions. Some basic steps were presented in the third chapter when addressing *participative observation sessions* in the *Research protocol* section following recommendations described by Dicks (2002) and Sung Heum Lee (1999).

Emphasizing collaboration and social networking

Collaboration and cooperation among students was good in all the developed projects but this level of interaction was achieved with different strategies in each of them. In UT Austin most collaboration was done in class even when supported with computers or the class network. In the U Lisbon the use of the blog combined with class activities supported good online collaboration practices. Strengthening collaboration and the use of social networks may be done providing structured activities for peer-to-peer project evaluation or promoting online tools for structuring collaboration between students.

Commenting each other's projects

Some students can be very critical when analyzing and criticizing other students' projects. Other may be very reserved to express their opinion openly. This was one of the reasons why the initial idea would be to have students' comments and discussions in a private forum where only class students would read and write. Asking students to comment in a blog may have contributed to less commenting activity.

It seems possible to have more students commenting each others' projects, at least in the final stages of the project production. For this commenting activity projects should be at an already advance stage with full working interactivity. Students should practice to make different kinds of analyses to others' projects. Guiding discussion in order to allow different kinds of criticism seems to be valuable. The professor may give the example, and promote on class discussion or request comments to be done according to different categories[92]. The aim should be to have some constructive criticism for each project in order for students to have the possibility of considering them for one final improved version. The professor should allow students to consider the suggestions done to their work and have an extended final date for a final project version.

This commenting activity can be set at least in two ways:

1. If there is in class at least one computer per project: Students can view, interact and comment each others' projects as they should be made available in the class

[92] Guiding discussion can be done establishing criticism categories. In Austin this was achieved using the *Six Thinking Hats* approach but other categories can be proposed according to different nature of the issues.

computers. Comments may be done using text documents in an online shared folder or in an LMS forum (e.g. class network, *Google drive*, *Dropbox*, *Moodle*).

2. If there is a place for the teacher or students to upload their project they may be online and be commented with individual text documents. It can be done in class or assigned as home work. For organizational purposes comments should also be shared in an online folder or in an LMS forum.

Creating a "How to…" webpage

Most problems encountered by one student are probably problems that all other students will also have. To facilitate each others' work an activity could be set for students to develop a glossary of frequent encountered problems. It could be set as a Wiki, a FAQ online page, a structured online forum or a glossary of terms. Authors present this kind of activities to be well accepted by students that perceive them to be supportive of learning (Hughes & Narayan, 2009). Students can be for instance required to present some problems they have faced and how they surpassed them. Different forms and different tools can be used for this purpose (e.g. *Moodle Wiki*, *Moodle Glossary*, Social forum, wiki webpage[93]).

Emphasizing conceptualization and interactive structure

As already mentioned not all students made full use of the Korsakow potential in developing semantic hypermedia and some might have ended the designed activities without fully developing their capabilities for defining complex non-linear projects. In order to extend the success in this matter three recommendations are proposed.

Presenting and discussing database media projects

In both UT Austin and U Lisbon the presentation of database media projects was done after students started creating their media or defining their project ideas. The visualization and discussion of the presented projects facilitated the comprehension of students and inspired them to explore alternatives to the most traditional interactive film formats. Doing this in the first class would help students to understand the type of multimedia ideas the professor would like them to explore and allow students to make this

[93] If your course does not have an LMS with forum, glossary of terms or wiki web page solution you may consider some alternatives available as open-source applications to install in your school server (Some of the best forums and wiki solutions are open-source: *php BB* - www.phpbb.com , *MyBB* - http://www.mybb.com, *MediaWiki* - http://www.mediawiki.org). There are also many commercially available wikis like *PBwiki* (http://www.pbworks.com/).

exploration before they invest too much in projects with other interactivity structure configurations.

Presenting and discussing Korsakow projects

Besides presenting and exploring one database media project it would help most students if a real Korsakow project[94] was presented. Ideally the professor would show the influence of keywords in the results achieved in the final user interface. In this way, students would be already presented with the logic that manages the dynamic generation of paths available to users in the K-Film interface. Having this explanation clear since the first classes will help students to start thinking in a multimedia project based on a process rather than a sequence of predefined paths. Students could be asked to write about one online K-Film describing what they like or dislike in the project, and what they think about its interactive structure strategy.

Extended presentation of Korsakow features

Showing most Korsakow features will make students more confident to start using the application and it will allow them to focus on their project structures instead of investing too much time in explorations of the interface and dealing with technical issues and already known bugs. This could be done by presenting step by step procedures or requesting some specific tasks to be done by students in class.

6.6 Summary

In these projects developed in Austin and in Lisbon both professors seem to agree that exploring semantic hypermedia provides great opportunities to explore fundamental aspects associated with new media production and presentation. They both found that the internet provided a great learning environment for students to learn from and to learn with. It was considered to facilitate students exploration and learning of important technical aspects (e.g. using software, solving problems while using applications) and also as a facilitator and supporter of different communication situations (e.g. discussing issues in class using examples, managing students assignments).

[94] There are several Korsakow projects that can be analyzed besides the proposed project done for the tutorial. It would be great if the professor could have access to the keyword setting of the project in advance. This would allow him to show the developed keyword structure.

Most students enjoyed the learning activities and the educational approach. Also it was considered both by the investigator and both professors that the model implementation was successful and should be used in following years.

In this chapter were described and discussed the main conclusions regarding the project implementation. The next chapter will summarize and contextualize these conclusions within the developed study as part of an emerging research field that was already identified by Torniai et al. (2008) that propose collaborative semantic-rich learning environments envisioning the birth of an educational social semantic web:

> *"… where pedagogically focused learning materials and activities are easily created, shared, and used by students and teachers; without the need for detailed knowledge engineering skills or know-how of advanced technologies." (p.388)*

Chapter VII

7. Concluding remarks

Digital media are increasingly present in schools and universities as the internet and digital devices are becoming pervasive in peoples everyday life. The ways in which these media are or are not adopted in class seem, in many cases, to derive from fascinations and fear associated with specific digital technologies rather than from research findings. The result, as most authors claim, is that the educational use of digital technologies in schools and universities is still insufficient and most instructional models are still based in lectures and readings contrasting with much of what students do with multiple digital media devices full of motion pictures, sound, and interactivity in other contexts. The educational research community seems to be still divided about what are specific benefits of audiovisuals and multimedia in class or in learning in general. Whether technology should be more or less present in classes is also matter for discussion as it seems that a learning theory that fully integrates and justifies the use of digital technologies is still lacking. The definition and discussion concerning media literacies is still evolving as digital technologies are becoming increasingly influential in society and in our culture in general. Many authors support that digital media has also a great influence in the way we think and that understanding how digital technology works is, in many cases, not intuitive but requires a special critical approach to its use both in schools and university. Many may agree that using digital technology in schools and universities is inevitable and eventually only a question of time. The question in this matter seems to be how schools and universities want to relate to society. We agree that the way in which technology is used in class influences the way students and young adults relate to technology. Maybe there is no definite general answer but only opportunities to evolve from work already done where specific technologies are particularly useful in specific contexts and for certain learning goals.

Research methodologies to support and study such opportunities for innovation in both technological and pedagogical approaches have evolved in the last decades supporting

ways for researchers to work in the field in close collaboration with professors. This dissertation was developed within this specific context and presents the results of a study developed towards the definition of a learning model that proposes the pedagogical use of semantic hypermedia and the internet in the classroom with the intention of supporting a range of skills and attitudes found to be increasingly useful.

The research approach was *design-based* using the same learning model in three iterations in undergraduate level classes of two higher education institutions. This approach allowed the definition and refinement of its design principles aiming for its adaptability to other contexts. The aim was to propose good conditions for students to develop a wide set of skills and attitudes toward an online participative culture using online materials, available applications and publishing sites. Students created their own semantic hypermedia videos and were able to use the ones developed by their peers. Discussions were mainly developed in class but computers and the internet supported many of the activities.

The dissertation begins with an introduction to the field of study addressing the major concerns that lead to the development of this work. In the introductory chapter, social and technological issues are described in order to validate and position the need to develop research within the field of digital media in education and, in particular, in the topic of semantic hypermedia in higher education. Still in the introduction the main objectives and the study outline are presented. In the second chapter a literature review is synthesized exploring the work and research done in several fields from education to cognitive science, focusing broad theoretical discussions, as well as concrete work done in the field of multimedia in schools and universities. The third chapter reviews important discussion on research methodologies and presents the methods and research design that was used in the projects. Chapter four and five describe how the three research iterations were developed in the courses at University of Texas at Austin and at University of Lisbon and their results. The sixth chapter provides an overview of the analyses and conclusions from the projects answering initial research questions and presenting further refinement of the design principles for the definition of further implementations of the teaching and learning model.

Contributions to the field

As field in the convergence of multiple disciplines and research traditions, education

is a stage for many different and competing research approaches and methodologies. Therefore a careful critical approach is needed when developing and refining a responsible research approach. The main contribution of studies developed with a *design-based research* approach is generally a set of principles as the ones presented here. A different contribution is associated with the research approach itself. Following a DBR approach within the scope of a PhD research is still not a common option and this study shows its applicability.

This work proposed the development of a learning model that supports the use of a new way of structuring content that allow students to explore, with the same application, sequential narrative and database structuring logics. The suggested learning model followed a framework that assumes a balance between the professor's role as mentor and tutor and the students' role as active constructors of hypermedia videos. It argues for a project-based learning model where students are given a brief for the development of a hypermedia project and have many opportunities to develop exploratory work while resolving a series of problems.

The use of video, hypermedia, and online communication solutions in class provided a rich environment that was both motivating and challenging. Collaborative work allowed for more advanced students to support others favoring the development of soft skills. Discussions with students about the use of videos, games, and social networks, suggests the importance of engaging with them about how they relate to these digital media. In this study it was possible to understand how much they value video as a didactic material and how they use the internet to learn about technical issues, solve practical problems and go through applications' tutorials. Using online videos for learning about academic subjects seemed to be mostly absent from their practice. Also absent in their academic lives were video games or other interactive media with witch most students recognized to have learned with. Hypervideo was a format mostly new to the majority of students and notions about hypermedia structure were limited. They were not familiarized with semantic structures although some were comfortable with tagging media online and to the ways in which for example *YouTube* or *Amazon* present options to users.

The use of blogs revealed to be helpful for professors to follow the students work

and provided students with the opportunity to develop and practice how to post rich media and how to organize information in their own blogs or post in a collective blogs both for others and for keeping a record for themselves. Students were not comfortable in making public comments to each others' and written or oral critical approaches to projects were only made in class.

Students' approach to semantic hypermedia authoring was quite diversified as some students needed additional time to understand how it could work and how they could use it for their own projects. For understanding what they could do with the proposed technology many students required close involvement of the professor or the investigator and used maps and visual representations of how to structure their project. The idea of ruled-based systems was seen as well adapted to most day-to-day life and the way society and economy are structured. Using the Korsakow authoring tool, students felt empowered with the notion of creating the rules of play themselves. Authoring activities allowed many students the opportunity to think in ways they had never been confronted with as for example the notion of an active audience and therefore a shared authorship of the multimedia environment.

In what concerns the adopted methodologies and methods used, the DBR approach proved useful to frame and guide the study and the research project. As claimed by Herrington et al. (2009) this type of approach is feasible to develop within the four-year scope of a PhD project. Defining interventions in the field for a period of about two months was helpful as these periods of preparation, implementation and data collection can be very intense. The option to have participants from quite distinct institutions was somehow a challenge for the project development but was highly positive as it allowed confronting very different experiences and cultures of the participants. The experience gathered during interventions was rich and the option for qualitative research methods was much rewarding. Focus group sessions with students were probably the most interesting methods used and provided much data for analysis while offering good opportunities to share with students some notions and concepts that seemed to be helpful for the development of their projects.

Further research and further directions

The need of exploring digital media and digital technologies in education is sustained by many authors that assume the nature of literacy as evolving as new

technologies and new practices develop (Leu at al., 2013; Lankshear & Knobel, 2006; Jenkins et al., 2009). As these authors propose, the evolving nature of literacy should not be seen as a problem but rather as an opportunity to participate in the construction of what it is to be literate in a changing world.

We believe that the description of the research methodologies and tools presented in this work will facilitate its replication in similar contexts allowing reinforcing or complementing the results and conclusions here presented. This approach allowed the development of recommendations and ideas for application with some variations to help its adaptation to diverse scenarios and contexts. Part of the projects' conclusions in chapter 6, are recommendations for both the development of the application used and for future projects using this learning model in different contexts. For instance two of the developments proposed for the Korsakow application would, on its own, justify the development of a similar research project. Having the possibility to edit projects online allowing collaborative work would certainly make students working dynamics in group change. Also having ways to visualize keyword clouds of each interactive video or having a way to visualize users' individual paths when visualizing each project would provide participants with much different experiences.

The majority of participants in this study came from interest areas related with media production or media studies and this contributed for their focus in the type of project and proposed activities. It would be highly interesting to develop this approach with courses or institutions with less familiarity to the theme. Many recent studies have, for instance, been developed with positive outcomes proposing the development of video and multimedia learning with pre-service teachers (Bruce, 2010; Heiden, et al., 2010; Kearney, 2013; Wu & Yamamada, 2013). This context for research would be certainly interesting for future implementation following the approach here presented.

Enhancements to the teaching and learning model presented also suggest that it would be interesting to apply this learning model to courses with extended theoretical objectives allowing eventually to further explore its potential in what concerns the support to students' cognitive development. With more time for the project development it would eventually be possible to explore changes in metacognition and retention in the studied subjects.

Interesting work could also come from using Korsakow with some variations of the developed design principles for the study of semantic hypermedia with younger students. Eventually more time would be needed to introduce students to the database and storytelling notions but younger students may be more flexible in the adjustment to notions of semantic structuring and to the editing interface of Korsakow.

The description here proposed of the developed implementations provides a detailed picture of what was done with students and by the students, and what was negotiated with the professor. It provides an insight of what challenges may arise in an implementation of a project of this nature and the results of assumed options.

> *"Design-based interventions are rarely if ever designed and implemented perfectly; thus there is always room for improvements in the design and subsequent evaluation." (Anderson, 2012)*

We hope this work may be inspiring for researchers and practitioners that are interested, as we are, in expanding the knowledge about what can be done to improve teaching and learning efficiency and, at the same time, support responsible ways for promoting digital media literacy in schools and universities.

Within the limitations of time and space for a work of its nature, we believe that this study made a sensible contribution by showing that it is possible to make valid and responsible research taking into account both systemic and analytical research tools based in both theory and practice that currently exists.

The emerging use of semantic hypermedia by an increasing number of practitioners and researchers seems to be providing the stepping stones for the rise of a consistent field of research already presented by Torniai et al. (2008). We hope that this work may have contributed at its scale to further ground our knowledge on innovation and action within this field.

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Professors initial interview (transcript)

Austin, October 13th, 2011

Used excerpts are in **bold** (**P8 and P21**) (Any name used was replaced to conceal persons' identity)

I - Your perception of technology

Interviewer – About your perception of technology use in class; there are some teacher that say that too much use of technology may replace teacher in the future. Do you agree with that?

Professor 1 – I think teacher certainly could be replaced by online learning, but having taken online classes, I definitely feel that I have better experiences in a direct interface with the teacher. I can only speak for myself, if people only experience online learning, and they never get to experience a good teacher then they may not miss it. The teacher can use technical tools to enhance students learning. The difference between a good teacher and a bad teacher may be that one teacher can use online tools but not providing integration to learn a particular learning concept. So I am not really afraid that teacher will be replaced. Online learning can be good for people that don't have access or could not afford it.

I – In this context, there are still some teachers in the other side of the line, most of the time, isn't it?

P2 - Yes, for instance *Linda.com* is a great way to learn technical things but the problem is the follow-up. If you have follow-up questions I think you can waste a lot of time trying to search the answer, while the teacher might be able to immediately answer your needs.

I - You feel that even with all the search engines popping around…?

P3 - Yes, they are amazing.

I - You almost can write questions.

P4 - Yes, for technical things, but for more conceptual things I am not sure that the technology alone can provide the perspective that a teacher or a person has.

I - Do you think teachers have to be technology experts to teach technology?

P5 – Here in our Journalism Department, I noticed that the TAs are responsible for teaching the technology, and if you would ask the professors… Take for instance Rosenthal, he is a very respected person in his field, but I'm not sure about the technical side like to put together a multimedia package. As a teacher, I would not feel comfortable if I wasn't knowledgeable of the technology. But that might be me. I like to know what I'm asking people to do, and understand the potential of the technology. That said, I am not a *Flash* expert, and my TA Simon is much better in technology that me. I guess it is on my best interest to get to the point where I can do it, but we can't be experts in everything. In the context of the *convergence culture*, the idea of *collective intelligence*, and what I have been reading about it, made me change a little bit about the way I view the need to know everything. Like this semester using *Korsakow*, when people ask me, I don't know everything. I know it's there...

I – … and people can look in the tutorials…

P6 – Exactly! Before, I use to feel obliged to know everything and not even touch it until I knew everything. But that is changing.

I - What do you think about students creating their own media for learning activities? Do you think students have enough skills to use digital media by themselves? Like, without tutoring them?

P7 – College level students could definitely search it out and use the tools, but I think that it is important to make them aware of big issues; like copyright issues, for instance. With *Korsakow* for example they could use it, but in terms of comparing it to their knowledge of existing practice in linear narrative. They could learn to use the software but the theory, I am not sure. I am not sure that they would be using it with as much knowledge. But then also maybe the teacher knowledge is actually holding them back from finding new uses in this different paradigm, I mean as they are digital immigrants.

I - And in what concerns technical skills to edit movies or little videos, are students prepared as they arrive to your class?

P8 - I am not sure. They say they can edit already, and then what I find is that they do know the mechanics of it, but the aesthetical and technical skills they learn in my class.

I - Which are the technological tools you teach in your class?

P9 - *Final Cut Pro*, *Photoshop*, *Korsakow*, *Flash*, blogs, rss, delicious, to manage their bookmarks, cameras

I - Whish technological skills do you feel more important in your class?

P10 - Being able to edit I feel it is important, audiovisual editing, interface design, typography, colors…

I - You feel that they develop some other skills? Publishing online for instance?

P 11- We talk about media asset management for creating media projects, so you don't get all disorganized.

I - You would say organization skills?

P 12- Yes.

I - Do you feel it is important to support activities that reach out of school? That they do within their communities or family?

P13 - I've often thought that they don't realize the value that they have for their families in terms of being able to tell their family stories. When we were teaching *DVD studio pro*, I encourage them to use home movies to figure out how they could deal with their personal archive. One girl did a project that was like a gift for her future brother in law, where she gathered interviews and footage, like her sister trying her wedding dress. Another girl had her brother who was serving in Iraq. She made a video postcard for him at home. So I believe these technologies can enrich their lives. And also I think they can use this in jobs situations.

I - Today we had that girl presenting her experience ("student at world" initiative). Do you incentive them to do this kind of experiences or work out of school, or helping people? Do you

believe that's important?

P14 - I do believe, but I don't think I should preach my own point of view to them. It's important, but I don't.

I - Some footage are from the streets, you think their projects might have something to do with their neighborhoods or things that happen in their lives?

P15 - The thing with *Korsakow* is that t it is so foreign to people, I really thought choosing a project that they could really get dusted in. It was important to pick a topic, like self portrait, that they could grasp the concepts. And that they could experiment the key wording, as well as interested in doing the videos. I thought that they would have a psychological investment in it. For instance if there is anyone who wants to do a more dense *Korsakow* film for the second project, I am still not sure if they should because I feel that they are just beginning to get the idea and then we are going to move on.

I - Do you use problem-based or project-based activities in class? What are the most significant results you get from these approaches?

P16 - Every class is project-based. Hopefully they will be *media thinking people*…with critical thinking skills. I think they really start to think about the form.

I - You believe that they learn other topics their dealing with in the practice.

P17 - Hopefully they do, I can't say. That's kind of what I like on graduate students, they are already thinking in things beyond "I want to be next Steven Spielberg". Or "I could not have any other class so I took this one", they are trying to get some skill to explore their ideas, like the case of Ana.

I - In your case, do you remember the difference between having a traditional class in an auditory full of people and other project classes?

P18 - Sure, but my undergraduate education was ages ago. And maybe the idea was "I will show a movie" that was as advanced as it got. They did not had *Power Point*, I don't even used a computer until I got out.

I - So you did not had that much project base work?

P19 - But when I got to graduate school, to Film School, than it was all project-based work, hands on. And it was really hard to mesh the classes that had problem-based work with the traditional "listen to the teacher and then write a paper". It's really challenging to blend those two, even our students in the MFA (Master in Fine Art) find really hard to blend their theoretical work with practical work. It is such a different brain function. When you are producing that's the only thing you want to do, you don't want to sit in a class and listen to somebody talk, or even if you want you don't have the time to think about it.

I - In this project, you ask students to think about themselves. And you think that there are necessary critical thinking skills to think about themselves?

P20 - Yes. I think critical thinking is thinking about how what you are putting together is going to be related to the audience. Of what value is that to the person that is viewing it.

I - You believe that while their doing it their also acquiring information or building some

knowledge?

P21 - One thing that I am really pleased about this semester, is that I am able to bring some theoretical concepts into my class, like in *the 6 thinking hats*. You know, writing about the *Korsakow* tool itself and understanding what that is and how it is different. Not just making work because it is different from what their experienced before. I hope they are developing another way of thinking about media, and their role… The hole ending thing, like *it is ending when the viewer says it is ending*, so you better make good SNUs (Short Narrative Units) otherwise people will be ending very soon because they won't have time, they will not be interested in making time.

I - You have any main theoretical concepts that you believe students should really acquire? Could you give some examples?

P22 - The notion of beginning middle and end or narrative structures; The position of the maker relative to the person who is viewing; The way digital media opens new possibilities for the way we think of filming video; How this can fundamentally alter what we consider a work product; The length of the video, how long should the video be, how will it keep the people's attention and trying to get them to make their ideas understandable with like 30 seconds. I am pleased that I put a time for the SNUs. So they really have to think about that. To really communicate clearly and in a short form and hopefully then when they go to a long form they keep that sort of discipline. And also that everything does not need to be precious. I think the idea of having to make many things quickly it's a good thing for them to know how to do.

II - Technology use for educational purpose last year

I - How about the way you communicate with students through technology? I've seen that you use blackboard, you change e-mails? You have the blogs?

P23 - I could probably could use the facebook with them and be all hip with them, honestly some of those tools take me more time than what I have.

I - You don't use chat technology?

T24 - I haven't.

I - Or forums?

P25 - I don't know… They would not necessarily be honest in their communication so that they know the teacher is reading it. I just feel that they have enough to do. The blog, I think is a big burden for them.

I – I don't know if you are aware of what Peter does. You know if he has that kind of communication with students?

P26 - I don't know how he communicates with them. Is interesting because, having been a TA, I know that they feel more comfortable just to come over to you. In this case Peter. For whatever reason, maybe because I am the authority figure.

I - So students don't change mails with you?

P 27 - They are welcome to, but only if they have a problem.

I - So you generally only send mails to inform?

P28 – Yes.

I - You don't even promote any online way of discussions between students?

P29 - Maybe that is something that I could do.

I – You find it is important that student show their projects online in their blogs?

P30 – And also to make them do the readings.

I – You believe that is a way to motivate them?

P31 - Only if it is for a grade. Like they are marked on it, I don't think that they would actually want to reflect. And I am trying to make them to develop a reflective practice.

I - Couldn't you just ask them to send you by e-mail?

P32 – I just think it feel more organized, it is more like a journal. I used to always have people do physical journals and they would cut out things and paste them in there and brainstorming. Maybe only 20% took advantage of that. They all had to do it, is just that only 20% of them made useful documents that they could use in the future or come back to it.

I - You think that while *blogging* they are having more success with that?

T33 - I think it is easy for them than writing on a notebook. And they can paste videos that it is great. I think that probably the same percentage what I call a good job. Maybe 30%.

I – Besides editing tools do you promote other tools? Presenting tools?

P34 - I would say *Korsakow* is a presenting tool! For the next project, they will use some concept drawings and mood board; here is the font, the color scheme, the graphic design element. They will use *Photoshop*.

I - They will use layers?

P35 - I'll give them a template.

I - There is no technology associated for doing this?

P36 - Maybe there is, I am just not aware of it. It seems there is a tool for everything.

I - What do you do with this mood boards?

P37 - They can present their concept. Like "My documentary is going to be about this…". My proposition to them is that the interface is another storytelling element that isn't available to you in traditional media, so why not take advantage of it. It provides the mood, the framework, that is unique to this form that you don't have isn't traditional stuff. Like how the font influence our feeling, this is modern this is clean, this is foxy… that kind of thing.

I - Do you use yourself other presentation tools? Like word or *Power Point*?

P38 - I use *Microsoft*, I just find *Power Point* is…, I probably should develop more digital tools, I am still writing on the board kind of person. I am trying to move more into a more polished presentation material. Just using blackboard has been an adjustment. I just keep my grades in a book, and I tell them how each assignment worth and they can do the math themselves. Now they

want to have everything in *Blackboard*.

I - You use *Blackboard* to grade your students?

P39 - In *Final Cut Pro*, in editing, I just mark on the timeline, so I put the maker in the place I have a comment, I use the software itself as feedback mechanism.

I - Even in blogs you also reply to them.

P40 – Yes, but they delete them, I think. Because I put the grades in there. I just send the comments.

I - They don't need to delete them, they can just not show.

P41 - Yes, they moderate them out.

I - Digital devices, do you teach them how to use some cameras?

P42 – Yes, the TA usually he teaches them. We have certain equipment allocated to our class. And Peter will have a lab on that. For this first assignment I just did not wanted to get so technological heavy with them. So I pretty much let them use what they wanted, they cold record it on their phones…. I did not spend much time talking about framing, composition… I gave them books to read but I really did not want to focus on that.

I - Ok, so I guess it's it. I just would like to know how many years of teaching do you have?

P43 - 13. And then I worked as a TA before that so maybe 15 or something.

I - Also it is not delicate to ask the age but you would be …

P44 - How old am I? 49.

I - It is done. Thank you a lot!

P45 - No problem!

Professor final interview (transcript)

Austin, 10 November, 2011

Used excerpts are in **bold** (**P2, P6, P12, P14, P23 and P36**)(Any name used was replaced to conceal persons' identity)

I - Students attitudes and skills

I - So the idea would be to know how different it was from other experience with other media than you have used. Difference in behavior related to using internet if you feel that they had some progress in using it, not only *Korsakow* but other technologies.

Professor 1 - I am not sure that I am interpreting your question correctly, but in terms of the feedback that I've got from them, when I asked them about their experience, they really liked the simplicity of it, the *Korsakow* tool, that it looked simple in the surface but that it was pretty powerful in what it could do. Several of them told me that they would like to experiment more in the future, they will, but... The one thing, and I've got pervasively, people were frustrated that if they got errors that they could not fix, and they had to start all over; or the software couldn't even be downloaded into their personal computers. I had the same experience it works here in the lab, and at home it doesn't even open. Did you had that?

I - It worked with some versions, it didn't work with others. So for instance I still don't have the latest version that came out last month, so I am still working with the one that I downloaded when you started the course. I was thinking more about the skills, if you feel that they developed some different skills wile using the application?

P2 - You know that is really hard to say. They talked about the idea of multi-linearity, that I doubt that it would be a concept that they would be using before. In that sense they can really sense what that means, and they had experiences with it. So that is a new concept for them. The idea of who is the author. The author of the text being a collaboration between the "user" audience and the "creator". That is a thing they started to realize.

I - You think that before they did not thought about that? Even when the viewer has no action, when observing a piece of art or a movie, the brain is interpreting and doing part of the work.

P3 - The idea of intellectual interactivity? We did not talk about it. In terms of the *Radio-Television and Film (RTF)*, the Department spends a lot of time talking about the idea of the author really making your intent clear, using the grammar of film language, to have your intent clear to the audience. How that changes when you do something like *Korsakow* is new to them.

I - You thing most of them don't have a background where they have more liberty to do creative open-ended things, that are not so explicit of what's the message or what's the point?

P4 – No, I don't think so! We train them exactly to be clear about their message. It is part of the canon of what we train people for in RTF. Like the 3 act structure, the narrative is drugged into them.

I - I thought that you would have some more artistic disciplines or seminars. Maybe in production?

P5 - If we do, I don't know about them. It is narrative storytelling, documentary storytelling. Aside

from animation and motion graphics. It's not the art school!

I – Do you think they were motivated while using *Korsakow* and until they finished their project?

P6 - Everybody seem pretty motivated and I offered extra credits to them if they revised their projects based on the feedback that they got from people. And probably 5 out of 13 went back and did revisions and some of them did revision after they screen their initial project in class. During the rough cut. They were motivated to try, at first everybody had this concept of randomness, that they could just keyword and it would make sense. And then realizing after looking at their own projects and having other people looking at them, that they needed some sort of ordering structure, some sort of idea of intent, so some of them went back and added text or some added a start SNU... Sandra did something really cool, people responded well to the idea of the chronology of her life, so she created a different interface for each stage of her life. Like the background graphic. First it was a flower blooming, and then it was half way open and then completely open. And so it was a graphic reinforcement of this chronology. So people would know to where each [SNU] belonged. Maybe it was imposing linearity on the non-linear.

I - Could you get to previous phases or stages of the movie?

P7 - Well, in some cases baby videos were available in others they were not.

I - You feel that they profited a lot with collaboration with comments that they did to each other?

P8 - Yes, aside from the interview, I thing about other semesters. I, as a teacher, wanted to keep moving forward and not allowing them enough time to reflect and feedback. For example this time, I had them write a prospectus, a proposal and in the past I take it and grade it myself. Which I did, but I also had them read each others. They went around reading each others.

I - So you liked a lot putting them together commenting each others' projects.

P9 - Yes, the main thing they realized, most of them, is that one or two had really… How strongly does the prospectus allow the person reading it to really understand the project, really see the project, and really know if it is a good concept. And by reading each other's they could help each other feel in the holes. And people who did something lazy… the main thing that made them do was that they had to collaborate. Any way that aside of what you are asking.

I - In the video projects, do you feel that they also helped each other, or was there competition?

P10 - I think that there was any competition at all that I know of. I mean, only against themselves, to make themselves better.

I – So, do you think they put some effort on their projects?

P11 - A couple of them putted less effort.

I - But the majority did?

P12 - Definitely they did. The fact that the video SNUs were short assignments helped a lot. They did not get overwhelmed.

I - And it started from the beginning of the semester?

P13 – Yes. I would do that definitely again.

I - You said before that you would cut one week to this kind of project. What would be the right amount of time for these projects?

P14 - We had the perfect amount of time for the project. It is just that we have not have as much time for the next project. I think 7 weeks is great.

II - Students' outcome

I - In relation to the students' outcomes. I know that you commented a lot in classes and you also wrote some reviews to students on the exercise of *the 6 thinking hats*. But what did you felt? Were there good projects? You find that they did a good work?

P15 - Do I think the projects were good? How do we define good? Do we define good… to me good is "do I want to keep looking at the persons SNUs?", "do I want to go back and get the ones I've missed?" that to me makes it good. And the biggest thing is that if the SNUs had like an obvious coherence, then maybe the projects were less good. Personally, I really enjoyed Martha project. Did you see Martha's project? I found myself wanting to see those videos.

I - Yes, I've saw them again just to make sure I've seen them all.

P16 - In fact I told her "I've been through your project 3 times! I'm missing the one of you in the beach!" I don't know if she took it out… Success would be… "does it paint a good picture of the person?" A lot of times where the projects fell short was: I asked them to use archival footage and incorporate archival footage in to their projects. And a lot of times they just took the archive as it were, and they didn't do anything to it… like mark it with their own stamp, so it seemed in some cases random. It demanded too much of the user. It got to the point that I think that if it wasn't for the class people probably would not get it.

I - These archives they took them from the *YouTube*?

P17 - They could take from wherever they wanted. They could take from movies, from *YouTube*…

I - Do you have an idea of how much was from their own movies or their parents?

P18 – Yes, they used home videos.

I - You think that some of them could capture that objective of the assignment? To provide an understanding of their self?

P19 - Ana did, Martha did, Paul kind of did, Joana was a bit confusing

I - You think they have developed creative solutions? There were things that you were not expecting? In terms of structure? The footage? In terms of interface?

P20 - Yes. Martha came with this interesting thing, that worked great that was, if you want to go to a different mood or place, she had SNUs that were transports, that I thought was a great metaphor. And Ana worked on a chronological thing which I thought it was interesting. And several of them realized the importance of having a start SNU, to like to create a statement or thesis idea.

I - You mentioned that they have more time to reflect think about their peer's project. You think the way you structured this activity fostered critical thinking?

P21 - Critical thinking? I think our students are a little short on critical thinking. Like, I tried to

encourage that through the use of the blog. The reflective practice, you know?

I - Do you think it promoted good interactions?

P22 - You mean the *Korsakow* tool?

I - I would say the hole activity.

P23 - Our classes were really good. I am really happy with the class this semester. It's not always that everybody likes each other. They are friendly to each other. There is not a group that is the in group and another the out group. This semester is really enjoyable for me. I have no stress or tension in regard to that.

I – Yes, I also felt that.

III - Korsakow usage

I - So specifically related to the *Korsakow* usage. You found that the application was easy to use for students?

P24 - I think that they could really benefit from spending the whole semester using it and doing other project. So they could really start to think about key wording and story structure and things like that. I am not sure they would have wanted to do another *Korsakow* film. I mean Florian's movies are much better than everybody else, because he has been dedicated to it. He gets how it works.

I - You think it has more to do with the logic of creating the movies, or are there problems in the interface that you think could be better designed?

P25 - I think it is pretty good.

I - So you think the problem is more related to the understanding of the concept behind providing the keywords.

P26 – Yeah, I feel that the people are really secretive about their keywording (not my students). If you ask Florian about his keywording, he does not answer it directly. Why?

IV - Technologic Activity Design

I - I don't know why they do that! You expect to use it again next semester?

P27 - I would love it if I get to get my classes again. I'll definitely use it again. But. It is my colleges that don't get it.

I - You think you might convince them to use it, one of these days?

P28 - I don't know. We will see. I think that a lot of the people in our department think of digital media as more as like motion graphic and animation.

I - So you support the idea of using it in other classes.

P29 - I do, definitely.

I – Do you think it is good a good tool for editing? Like they are also learning important issues even for linear editing?

P30 - I think they are unrelated. I don't know. It's an interest on my part. Well, I think a lot of people get interested in *Korsakow*, because they think they don't have to "edit" but I think that good *Korsakow* films don't shy away from editing.

I - I thought that you told that it was a good exercise for developing editing skills. Like, the ways how pieces of media could be related to others.

P31 - I think it would be cool for editing students to do a *Korsakow* movie just for fun. But I don't know if they would have time to do it.

I - Relatively to the ways the activity was structured… You mentioned it went well; the amount of time was good. Would you change anything in the project assignments? Next semester for instance?

P32 - I think, I pretty much will do the same thing. I mean I was really happy with the way it worked out. I might make them actually… I suggested they go on the gallery of *Korsakow* and look at the projects but, I might make them write about it. Like view a full project and then write about it. To start to think of what are the things that are connecting these SNUs together.

I - You kind of asked that question to them in relation to their peers project. But they did not write anything, did they?

P33- I didn't read their comments to each other. I guess I should have.

I - You still have time.

P34 - But they said the comments were helpful.

I - I still haven't read them all. To wrap up, would you point some virtues that you really enjoyed in using *Korsakow* and after that weaknesses that this activity had?

P35 - **It is great. Because it gets them thinking about like: who is the author. What is the audience experiencing.** How to get what is in their head. The experience of the user. That's a good thing about it. I guess we had too few SNUs to really get into the multi-linear narrative. I still feel like, the question of whether the Korsakow films are narratives, is a question that not even I know the answer to myself. It is still intriguing to me.

I - You think that that can be pointed out like a weakness or …

P36 - I still wonder if it is any there there? About Korsakow! I am still fascinated by it. But I am not sure I would call it a narrative. Can a database be a narrative? I don't know if the answer is yes. Is like the question of "where is the end?". It is like a narrative should have an end. The question is it a narrative or is it not? Is still a valid question for debating. I don't know the answer myself so it is why I am still interested in the software.

I - You think it will lose your interest if you figure it out? Or you think that, as it is, it will continue to be interesting to use.

P37 - For me I am interested in using it for myself for a different reason. Which is not because I want people to experience the totality of my SNUs, but because I am putting it into an environment where people by their nature are going to be exploring.

I - But for instance, for your own projects. You are thinking to further use it?

P38- Yes, I actually am thinking about completely taking all of my *Barton Springs* [her multimedia project] content and make it into a huge *Korsakow* film.

I - Interesting. Ok. It's done!

Teaching Assistant Interview (transcript)

Austin, 3 November, 2011

Used excerpts are in **bold** (**TA23, 39, 31, 33, 34, 35, 36 and 37**) (Any name used was replaced to conceal persons' identity)

I - Perception of technology

I – Do you have much experience as a teacher, one year or two?

TA1 - No, just started this semester.

I - Ok. So as regarding to technology do you think that too much use of technologies may replace teachers in the future? With so much information that is online and so many search engines, that reply to you? Videos and all?

TA2 - It is interesting, I want to tell you yes, on one side, and then no in the other hand. There is so much information online, I've learned a lot of things online. But a lot of that information, you don't necessarily apply it unless you have someone to guide you through. And it is always nice to have one on one contact to guide you through. It works for things that are very specific. Like facts. Like, you read online somewhere the formula for water, is H2O all right? That's a fact. And you just memorize it. But when it comes to developing and bind those ideas. I don't think technology will replace somebody that will guide you through. How you can develop those ideas. Whereas for knowledge, advancement, for applications…

I - But haven't you use *YouTube* to know how an equipment work, or application? Something you want to do in *Final Cut Pro*?

TA3 - Yeah I do it all the time. And I learned a lot of things that way. But as I told those are very specific things. Like facts. Is not that we can have a discussion.

I - You think that it is very important that the teacher know how to use the technologies to teach technologies? For instance you are explaining how to use specific technologies, you believe it is quite important that you know everything about the application before starting teaching it? Or students might learn by themselves?

TA4 - I think a lot of the times students learn by themselves! The thing that is good is that you know what you are doing! You know how to use the technology because at least you know what possibilities you do have, and then depart from that. Because if you don't know what it does, and then the students are thinking about applying it, it's like you are limiting them from the bases. They can depart from it, and then I don't think that the teacher necessarily needs to know all the complexity about it. But I do think the solid bases need to be there.

I - Your opinion about: If students learn a lot while creating things? As for instance, you ask them to film about something. You think they learn by themselves while, thinking about the questions, while editing… you think they learn a lot from the process?

TA4 - I think so! At the very least it challenges them. Wheel, it is not just me telling you what to do. I'm giving you bases. And then you come up with whatever thing works for you. And then you start

to think and exercising those… What were you calling them?

I - Skills?

TA5 - Yes Skills! It is something I would like my teacher to tell me. Also because it expands the possibilities of what it can bring.

I - For instance now they [the students of the class that left the room] are just shooting, filming. You know that they already have some skills before picking these cameras, as they used cameras before to do some footage. What do you think is going on? They already know enough to do something? They should learn to use this new equipment? You told them everything they needed to know about the equipment? Or you think they are going to learn by themselves? They will learn more than what you taught them?

TA6 - I think they are going to learn more by themselves! There are plenty of things I did not tell them about the equipment! And I started hitting the floor running, on purpose. At least the very basics, you are comfortable with. This, this, and this… and let's go! I am sure they are going to encounter at least one problem. And then those moments of tension are going to exercise all different skills. If you encounter some troubles you have the basis to troubleshoot it and depart from there.

I - What do you think it is most important in this course for them to learn? Which skills are very important? Technical ones?

TA7 – Technological ones. I think it is good to have solid basis of what they can do with the technology. But that does not mean anything if there is no meat! If at the end of the line they cannot create ideas. Or just be honest with themselves.

I – So, not just technological skills.

TA8 - Technological skills are important only if they can apply for something they want to create. Not just technology for the sake of technology.

I - Do you feel that it is important to support activities that reach out of the school environment? As this one for instance, students when to the street to film and to do something. Can you give other examples? Of whish things you think could be interesting to have students do outside of their class environment, these four walls.

TA9 - I mean it is really interesting that question because at the end of the line, life is life. And you can institutionalize education but. You are ruled by the walls of the institution. What happen when you get out of those 4 walls? What happen when you don't have an institution to fall back? An institution to dictate how you are going to learn. I think it is very important that the skills that you get you apply outside every moment. Technology does not mean anything if no ideas can be generated. Not for the sake of other but for the person the students themselves.

I - (This is a bit tricky because I kind of know how you do it. But, do you use problem-based activities in class? I know that most of the classes are run by Karen.) How important you feel it is to have problem-based activities? You feel that it is important?

TA10 - I think it is important, and I t is also more fun. Because that engages the student a lot more. Because they have to participate and so it is more interesting for the teachers and for student as

well.

I - Anything else? That you find interesting in problem based?

TA11 - I think it also helps to create a sense of community. Especially when this problem-based is not like "you do it, you do it" and "do not collaborate". So when students have a problem and are encouraged to collaborate. It creates some sense of community and team work. Team work is really important.

I - How come? Why do you think it is important? For instance, now you assigned more or less a role to each student. Why do you feel it is important?

TA12 - Well in this case is more for organization and logistic. For example if "all right you can do whatever you want, then…" You saw it at the beginning when we just brought the equipment and I told "We are going to deal with this equipment" then everybody started doing whatever they wanted. And then when we assign the teams with their roles. They were more looking and not doing anything. Assigning them roles it helps with logistics; it makes the work more efficient. But also team work. And team work has a lot to do with trust. "Do you trust this person will do his job right? And if he does his job right I will do my job right!" And then we will be all creating something that will benefit us all.

I - Ok, this is a question more related to your last year of using technology! Even if you where a student! How do use technology to communicate? Do you use blogs?

TA13 - I have never been a big fan of blogs. I think they are important but I don't personally use one. I communicate a lot through e-mail. It just makes things efficient. And also you are dealing with lots of thing at once. And when you send a mail there is a record, and so you keep track of things.

I - Have you used chat, *Facebook* or *Skype*?

TA14 - I don't use *Skype* but I used chat when I was younger. To see how it looks like. I do have a *Facebook* account, but don't use it very often. It helps me keep in contact with people through my life.

I - Did you encouraged the use of e-mail with your students. And have you exchange some mail with them?

TA15 – Yeah.

I - Do you feel it is important for student to show their works online? For instance they have been publishing some things on their blogs. You thing it is important to encourage that?

TA16 - I just think it is important because it helps them to get feedback from people that might not be immediate. It also helps to be able to history of what they are up to. They can also have an audience that is not immediate also. I think that is really a great advantage.

I - What technologies are you teaching or going to teach? What applications?

TA17 - Software? Wheel… Because we deal a lot with editing, we started with *Final Cut Pro*, but some people don't like *Final Cut Pro*, so we used premiere, some people don't like *Premiere*, so they used *Avid*. I like *Avid* for example. A few wanted to experiment *After Effects* so we did that. Obviously *Korsakow*, because that was a helpful tool for the goals of this class. And then are going

to deal with *Photoshop* and ultimately with *Flash*. And a little bit of HTML I think.

I - Any application to deal with HTML?

TA18 - They can use *Dreamweaver* but they can know the basics of hand coding.

I - Audio application anything you will use?

TA19 - No, not in this class.

I - Whish devices do you teach them to use?

TA20 - They are encouraged to use any camera they want. We do a general run, what cameras do and what don't! And if anyone wants to use a specific they want to use, then they come and we figured out something. For this class they have allocated *Sony V1*, and other sound equipment.

Your age, is between 20 and 30 years?

TA21 – 24.

II – Students' attitudes and skills

I - Regarding the attitudes and skills of students. Have you felt changes in the behavior of students? Before and after they started using *Korsakow*?

TA22 - In what sense!?

I - As using the internet to grab videos, speaking about *keywording*, about editing!

TA23 - I think it is to early right now, to say. Because they just ended their last project this week. They have been thinking about key wording and how they are going to edit with. Not in relation to a single piece but to different pieces of videos. And how to make a story with that, not necessarily a cause and effect. So yes they have been thinking about that, but I cannot tell you if that is something that has influence in some future work. Or if they did it because they had to, at this point. Some students have been really encouraged, and they are really excited to continue with this idea of multilinear story.

I - Some of them you found that they were kind of engaged?

TA24 - Yes. But at the same time I feel that those students were engaged from the beginning! So I don't thing that I can give you an accurate answer for that.

I - But you felt that some students didn't like that much the application? Have they change their behavior while using it? You don't believe that?

TA25 - I think it was more of a response.

I - But if they were using only *Final Cut* for editing for instance. You thing they would be fine with that? You think they found the application a bit clumsy? Not that much interesting to use even for this project?

TA26 - I did not get any reluctance from anybody. Because they have other classes they are sometimes a little bit tired but reluctance like people saying "I don't want any of this, I don't know why we are doing this…" I did not seen any of this.

I - But they have felt a little bit lost? At least at the beginning?

TA27 - Some of them yes, but a think it had more to do with the time. They had a lot of other things. A little bit to the way the software is designed, but not necessarily that. There were no bad feelings from their part.

I - I don't know if you saw their blogs online. You saw any comments between each others?

TA28 - No I haven't.

I - You think they invested a lot to try to do something good.

TA29 - They did, that something I appreciated! A lot were limited with the technology, and problems they found. Also the time that they were given to complete the assignments were… some of them felt a little bit short, to actually give it a little bit of extra thought. But I am sure they put effort and work, I saw some projects that I thought "This is really nice, this is really good".

I - And it is about 10/12 project!?

TA30 - Should be 12.

I - How many projects were interesting and with quality?

TA31 - That's a tough question! Because you can define quality in different ways, but also because for me what it does really makes it interesting is that: 1 - it is engaging somehow (but I think that my response can be really biased. Because I am engaged with students already, and when they come up with something honest something related to themselves for me that is engaging); so I think it comes the problem of execution. How well executed whatever ideas that they had. I have seen some projects ideas that were like really neat, technically might not have been the best projects, but execution of the ideas was really there. Some other projects needed a little bit of help, I sort of get it because I know the person… But for the most part, in terms of quality... as I said I think I am biased, for what they bring to table with honesty that's for me what it is interesting.

I - Do you feel that most of them could overcome and bring some of that things that you appreciate. You think that most of them reached that or most of them did not get there?

TA32 - I think that most part the intention was there. I feel they fell behind in execution. But a big part reached what I consider high standards.

I - You think that while thinking about the way of editing in *Korsakow*. You think that it was a helpful exercise for them to discover something about themselves? Like, the theme was "me" or "myself". You think that that was good for them? I've seen that you had lots of talks with them and also (the professor). You think it was useful the way that the exercise was set?

TA33 - To discover something about themselves, I don't think I can give you an accurate answer for that. One thing I will say, is that… what they started presenting was something that was superficial. And then we encouraged them to dig a bit more into themselves. Like "I can make those judgments just looking at you! I want to see more!" And that's something we encouraged! And after those talks, they did a bit of introspection and came out with something, where I can see more, I can see things that you enjoy, discover little things about them.

I - You think that it would be any different if you were using just *Final Cut*? Just linear narrative?

TA34 - Yes. Not necessarily about the thing they are going to discover about themselves. But in terms of how they put a story together.

I - Because they have to verbalize it in key words? Why do you think that?

TA35 - No, because there are not looking at each scene from the point of view of "this happen, now this has to happen". And then how do you connect this in a logic line. And in this scenarios, I am thinking about this idea that I have write here and this other idea that is here (holding his arms apart). And there is so many ways in which I can connect these two ideas. And not necessarily because something happened here and something happened here (holding his arms apart). But maybe because of the relationship of this emotion that happened here and this emotion happened (holding his arms up with the hands apart). A little bit like dialectical editing but with more options. Relations here and relations here. It can also be cause and effect but it gives them more things to think about.

I - You think that they came up with creative solutions?

TA36 - I think so. Yes.

I - How about critical thinking? You think that they showed critical thinking while digging into these issues?

TA37 - Yes. I think so, it is not so obvious to see that, but I think it is embedded in the work they produced.

I - And what concerns group interaction have you seen that happen even being individual projects? Do you think that they helped each others?

TA38 - Yeah, I mean it is a small class, so it is also time to get to know each other and collaborate a little bit. And give themselves comments and hear from each other. Which I think that is real good.

I - Now concerning the use of *Korsakow*. You found that the application was easy to use?

TA39 - Pretty strait forward.

I - And why?

TA40 - Because , what it does is very specific. It comes to a point the creation and the creativity comes in how you put it together. And what is the content that you bring into *Korsakow* but not necessarily how you use the software. It is like: you import, create keywords, create an interface for the user to interact with, and you are set. To use the software: I don't think it is complicated.

I - You think they had a hard time adapting to the application?

TA41 - Not necessarily the application itself, more to think about how to put things together. How to make sense when you don't have cause and effect.

I - You think you would like to use *Korsakow* with your students?

TA42 - Yes. Personally I think it is a good tool to think about other ways of storytelling. But I would encourage them, after they get use to that kind of thought, to use other technology. So you

can prove on that technology. Where there is more customization.

I - Because *Korsakow* I think is limiting. Not necessarily in content and in what people bring.

TA43 - For instance: the interface - While you can create your interface in *Korsakow*, you are limited by the objects that you can put in the Korsakow interface.

Yes, like the widgets.

TA44 - Like the widgets.

I - But you think that it has some advantages in relation to using *Flash*?

TA45 - The advantage will be that it is easier to use. In *Flash* you have to create your own video objects, but because of that you will have more control of who you present it.

I - But for instance, concerning this way of connecting all the segments or videos, doing this in *Flash* would take ages no?

TA46 – Yes, it would take ages, exactly.

I - You would have to program it by yourself…

TA47 - It would be a lot.

I - Would you use it for yourself the application?

TA48- I like the idea, I like the way it presets things, but I think that for me I would like to use something that I can customize more.

I - What would be good improvements to the application for teaching purposes?

TA49 - For teaching purpose… I think it has some areas that are in the air. Like subtitling, the way it is explain online does not really work. But that is more like a technical issue. But when it comes to teaching. I don' t know?

I - Any other thing you would improve in the application?

TA50 - I think resolution plays a big role. It limits you to the standard definition. And also the codecs, it does several codecs but we got some problems for some that diverge a lot from H.264.

I - Concerning the design that was proposed for the activity. You think it was well set? Would you change things in the future or advise teacher to change something?

TA51 - No, at this point no, especially because we are dealing with *Korsakow* introductory level, and they will be jumping from there to create more personalized multimedia. So like I said *Korsakow* is a good jump start. For start thinking of ways you can connect media. That is not necessarily from media 1 to media 10.

I - There are students from the 1st years, 2nd years, 3rd years?

TA52 - They are mostly sophomores, 2nd years. A few juniors, 3rd years and two graduate students.

I - You think that it should be earlier? That it should be the first application to use to start editing? Or only when they already know editing basis?

TA53 - They have to as prerequisite. I mean, I think it that it is god that they have some previous

experience before coming to this class. So you can hit the floor running.

I - You think that it might be a good activity to have in other classes? Would you advise any other teacher to use this application or this activity in their classes?

TA54 - You mean *Korsakow*?

I - Yes *Korsakow* and the whole set, putting students editing movies.

TA55 - Editing, movies and stuff they do in other classes. For their own projects. That is something that they are constantly doing. *Korsakow* is very specific. I think that at some level they deal with interactive technology, interactive media. *YouTube* for example, you have to choose your content. Teachers assign a problem and "You could watch this video on *YouTube*" and you watch it and then you can gets something else, you watch it and then you get something else… Teachers are putting into use, at some level, but it comes to an end when you ask "what do you want?"

I - Do you think it might be interesting, for instance even in classes that are not that much oriented to interactive storytelling. It might be good for them to explore some editing skill, team work, key wording if you feel that it is interesting? You thing that that's something that you might tell teacher "this application can do this and that, and it might be interesting for your students to explore this non-linear way of editing" you think it might work in other classes?

TA56 - I think it will work for presentation, for putting ideas together, for brainstorming of ideas, especially because you have multi paths. And when you have these multi paths you come up with different conclusions. And when you have different conclusions, then you can think about more stuff and push the boundaries. In that sense, brainstorming.

I - What weaknesses do you find in these kind activities? What do you think is not that good?

TA57 - Like I said it depends of what you want. For example, I am a big fan of traditional narrative, and the reason for that is because it is entertaining, because we are used to it, and because it puts you in the press mode where you are voyeuristically looking at something, and you just let the suspension of it really flow. For an interactive story, you watch something and then you have to go there and click again, and then that's a distraction, that's like: breaks the suspension of disbelieve. I enjoy suspension of disbelieve. That is why I am a fan of traditional media. Also the other thing which I think to be a disadvantage and I think it is too early to say because there are different kinds of storytelling. It allows a lot of randomness if it is not super built up.

I - Ok it is done

TA58 - Really!?

RTF 344M Fall 2011
Digital Interactive Storytelling

[redacted] **-Instructor**
[redacted] **T.A.**

RTF 344M Interactive Digital Storytelling—Fall 2011
[redacted] Instructor [redacted] Teaching Ass't

Unique #08285
Class Meetings and Lab CMA 4.206E
MW 10:30-12:00
Lab Wed 5:00-8:00

Instructor:	[redacted]
E-mail/Phone	[redacted]
	Phone [redacted] o later than 9:30 p.m.
Office Hours:	9:30-10:30 and 12:00-12:30 on Monday and Wednesday During office hours, I will likely be in the lab, not in my office, so it is best to make an appt. by e-mail or text
T.A. e-mail and phone	[redacted]
Lab Hours:	As Posted. These will vary throughout the semester

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Course Description:
In this hands-on production course, you will explore platforms for digital, interactive storytelling. By studying existing digital, interactive media productions and by creating your own, you will expand your understanding of the ways in which digital media products are distinct from traditional, linear media productions. You will also begin to understand how this distinction may impact your ideas about storytelling with film and video.

You will plan, design and implement two digital interactive projects, and in the process learn about digital production planning, management and strategies for evaluation, graphic, interface and interaction design, and other technical skills related to digital post-production. The course will also cover theoretical issues related to the creative practices and understanding the qualities that make digital productions distinct from traditional film and video productions even though both may be created using digital technologies.

In this course we use: Adobe Photoshop, Final Cut Pro, Korsakow tool, Wordpress, Flash, Delicious and RSS. Specific training will **not** be provided in Final Cut Pro, but there may be opportunities to learn this through informal training sessions at the Digital Media lab. If you do not know Final Cut Pro or another NLE software, please let me know so that we get you up to speed.

Projects produced in this course may be documentary, fiction or experimental.

Please note that this is not an entry-level production course, but is intended to build on previous experience in narrative, experimental or documentary production. RTF 318 or 319 are required pre-requisites, but an entry-level production course and RTF 346 are **highly recommended** before taking this course.

We will do a lot of hands-on work so comfort with the computer is essential.

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Digital Interactive Storytelling

[redacted] **Instructor**
[redacted] **T.A.**

Required Reading: All required reading is available on-Blackboard or on-line. A week-by-week reading list will available on Blackboard in the Announcements Section of Blackboard. The actual readings will be in the Course Documents folder.

Recommended Books:
The following books may be helpful to you for reference. You may often find books very inexpensively through Amazon.com.
Digital Storytelling by Carolyn Handler Miller
Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules (available electronically through the UT library catalog.)
Adobe Photoshop CS5 Classroom in a Book
Adobe Flash Professional CS5 Classroom in a Book
Flash Journalism: How to Create Multimedia News Packages by Mindy McAdams.

Required Equipment:
In order to store your work, you will need a Mac formatted Firewire hardrive-7200 RPM. I would recommend no smaller than 500 gigs. Please consult me if you have any questions about what to buy. This should cost no more than $150.

Grading:
This course will use the plus/minus grading system.

Project One	Multilinear narrative using Korsakow	30%
Project Two	Collage/Journey project using Flash	40%
Lab Assignments		10%
Blog	See Blackboard Announcements each week for blog prompts	20%

Attendance Policies
Full participation and attendance are extremely important for this course. This is not a huge lecture class where your absence may go unnoticed. In fact, in a world of **budget cuts and on-line "learning"** we are so fortunate to have such small classes where **personal attention and human interaction** are possible. Bottom line: If you are absent, you will be missed! Below are the specifics. I encourage you to communicate with me about problems, deadlines and other impediments BEFORE they become a problem.

If you miss more than 3 required labs or classes combined, you may lose half a letter grade for **each** absence over 3. There are 28 class meetings, 12 labs, plus, meetings.

Missing class when in-class presentations or meeting are scheduled will also count 5 points off the final assignment for which they were missed. If others are presenting and you are absent, the points will be deducted from your project grade.

If you are more than 10 minutes late to class, you will be counted absent.

If you miss four consecutive class meetings (including labs), you may be asked to drop the course.

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[redacted] **T.A.**

A note on mobile devices and cellular phones

Please do not use mobile devices or laptops for personal business during class time at any time!!! If I see you using your mobile device in class I will count you absent for that class. I will likely not embarrass you or myself by asking you to stop texting, surfing, etc., I will simply mark you absent for that day.

Assignments

Late assignments, assignment milestones or missed appointments will lose 5 points off of the final grade for each stage deadline or appointment missed.

Please note that the syllabus is subject to changes and additions. Please ask if you have any questions about what to read, study or do.

NOTES:

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[redacted] **T.A.**

WEEK 1 August 24

Wednesday
What is interactive digital storytelling?
Some examples
Video Assignment One discussion

Assignments
- Producer video assignment one. Bring the video to lab on August 31. You will learn to use the lab, and the workflow for our projects.
- Weekly Readings - see the Blackboard Announcements for weekly readings.
- Blog Prompt One-Write 500 words about your impressions from the initial class discussions, viewing and reading. The entry should be equallyt divided between those three things. Put your documents on the classes share by Friday August 29th. This will eventually be transferred to your blog, which will be explained on Wed. the 31st in class.

WEEK 2 August 29-September 2

Monday
Project One Discussion
Organizational Strategies and Workflow
Video Assignment Two discussion

Wednesday
Tacit vs. Explicit Knowledge
Developing a reflective practice
The Blog

Lab
Workflow for Videos
Edit your video
The voice over room.

Assignments
- Produce Video Assignment Two, bring footage to lab on 9/ 7
- Weekly Readings

WEEK 3 September 5-9

Monday
LABOR DAY UT HOLIDAY

Wednesday
Working with Archive
Rights
Use of Archive in the DB narrative
Technical Issues: Formats and Working in FCP
Introduction to Video Assignment 3

Lab
Video Project Two, bring footage to lab—if you can do some work on this before lab, it would be good.

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Week 3, cont'd

Assignments	Produce Video Prompt 3, bring footage to lab on 9/14 •Spend 30 minutes exploring the Korsakow website before class on Wednesday September 12th http://korsakow.org/

WEEK 4 September 12-16

Monday	Introduction to the Korsakow Tool for creating multilinear narratives Video Assignment 4 Discuss **Video Assignments 1 and 2 DUE, post to classes share and blog**
Wednesday	Korsakow Tool, further exploration Links are Edits
Lab	Bring Archive Clips to lab, edit, process, and post
Assignment	Week 4 Readings

WEEK 5 September 19-23

Monday	Readerly/Writerly Introduction Video Assignment 5 **Video Assignment 3 Due post to classes share and blog**
Wednesday	Closure in Korsakow films Discussion of Work to Date
Lab	Sketching with the Korsakow tool
Assignments	•Continue Work on K-Film •Week 5 Readings

WEEK 6 September 26- September 30

Monday	**Video Assignment 4 Due post to classes share and blog** Thinking Hats
Wednesday	Review and Approaches to keywording Customizing the Interface
Lab	Project Work
Assignments	•Continue Work on K-Film •Week 6 Readings

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[redacted] **T.A.**

WEEK 7	October 3-October 7
Monday	Review of Korsakow works-in-progress in groups of 3 **Video Assignment 5 Due post to classes share and blog**
Wednesday	Review of Korsakow works-in-progress in groups of 3
Lab	Project Work
Assignments	• Revise and Complete your Korsakow film for Monday October 10
WEEK 8	October 10-14
Monday	Review Final Project One Work
Wednesday	Review Final Project One Work
Lab	Equipment Training
Assignments	• View the projects on the classes share and discuss in your blog which ones you find compelling and which ones not. Keep in mind the "Thinking Hats" reading.
WEEK 9	October 17-21
Monday	Introduction to Project 2 interactive collage or journey Examples of Interactive Projects Conceptual Framework Granularity/Relateness
Wednesday	Stages of the Project
Lab	Photoshop Intro
Assignments	• Work with your group to come up with an initial project proposal to present on Monday • Week 9 Readings
WEEK 10	October 24-28
Monday	Presentation of Initial Ideas to Group for Feedback
Wednesday	Interface Design Typography Color
Lab	Flash
Assignments	• Week 10 Readings

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WEEK 11	October 31-November 4
Monday	Interface Design Typography Color, cont'd
Wednesday	Mood Boards
Lab	Flash
Assignments	•Week 11 readings

WEEK 12	November 7-11
Monday	Creating a Mock Interface/Photoshop
Wednesday	Creating a Mock Interface/Photoshop
Lab	Flash
Assignments	Project Work
Meetings	**Group Review of Project Assets with Instructor**

WEEK 13	November 14-November 18
Monday	Presentation of Working Prototype and Sample Content including Mood Boards
Wednesday	Presentation of Working Prototype and Sample Content including Mood Board
Lab:	User Testing/Project Work
Assignments	Project Work

WEEK 14	November 21-November 25
Monday	Group download session. Semester review
Wednesday	No class or lab
Assignments	Project Work

WEEK 15	November 28-December 2
Monday	Viewing of Final Work
Wednesday	Viewing of Final Work

NOTES:

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[redacted] **Instructor**
[redacted] **T.A.**

The University of Texas Honor Code

The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

Scholastic Dishonesty

The University defines academic dishonesty as cheating, plagiarism, unauthorized collaboration, falsifying academic records, and any act designed to avoid participating honestly in the learning process. Scholastic dishonesty also includes, but is not limited to, providing false or misleading information to receive a postponement or an extension on a test, quiz, or other assignment, and submission of essentially the same written assignment for two courses without the prior permission of the instructor. By accepting this syllabus, you have agreed to these guidelines and must adhere to them. Scholastic dishonest damages both the student's learning experience and readiness for the future demands of a work-career. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. For more information on scholastic dishonesty, please visit the Student Judicial services Web site at http://deanofstudents.utexas.edu/sjs

Undergraduate Writing Center

The Undergraduate Writing Center, located in the FAC 211, phone 471-6222, http://www.utexas.edu/cola/centers/uwc/ offers individualized assistance to students who want to improve their writing skills. There is no charge, and students may come in on a drop-in or appointment basis.

Services For Students With Disabilities

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TTY.

Religious Holidays

Religious holy days sometimes conflict with class and examination schedules. If you miss a work assignment or other project due to the observance of a religious holy day you will be given an opportunity to complete the work missed within a reasonable time after the absence. It is the policy of the University of Texas at Austin that you must notify each of your instructors at least fourteen days prior to the classes scheduled on dates you will be absent to observe a religious holy day.

University Electronic Mail Notification Policy

All students should become familiar with the University's official e-mail student notification policy. It is the student's responsibility to keep the University informed as to changes in his or her e-mail address. Students are expected to check e-mail on a frequent and regular basis in order to stay current with University-related communications, recognizing that certain communications may be time-critical. It is recommended that e-mail be checked daily, but at a minimum, twice per week. The complete text of this policy and instructions for updating your e-mail address are available at http://www.utexas.edu/its/policies/emailnotify.html. (Optional: In this course e-mail will be used as a means of communication with students. You will be responsible for checking your e-mail regularly for class work and announcements.)

Use of Blackboard

This course uses Blackboard, a Web-based course management system in which a password-protected site is created for each course.

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[redacted] **Instructor**
[redacted] **T.A.**

Copyright and Fair Use:
You may find the need to use copyrighted material this semester: music, photographs, movie clips, or any other expression. For many of your uses, you need to find the copyright holder and negotiate a license. You own the copyright to the work you produce in this class. As a copyright holder yourself, you understand the importance of copyright ownership. It is your responsibility to secure music and archival footage licenses as well as artwork, location and personal releases. You will find release templates on the RTF website.

For some uses, however, neither you nor anyone else needs to license copyrighted material. This is because copyright law exists to encourage and support creativity. Copyright law recognizes that creativity doesn't arise in a vacuum. As creators, we all stand on the shoulders of giants. New works of art (such as films, books, poems, paintings) all make use of what has gone before. Thus, copyright law not only protects authors with a copyright that lets them decide who can use their works, but also offers exemptions from the author's control. For filmmakers, the most important exemption is the doctrine of fair use. You can rely on fair use, where appropriate, in the film and media projects you undertake for this course. If you are making a documentary film, consult the influential Documentary Filmmakers Statement of Best Practices in Fair Use (http://www.centerforsocialmedia.org/files/pdf/fair_use_final.pdf), which was created by a group of national filmmaker organizations, has been endorsed by the University Film and Video Association, and is now relied on by film festivals, insurers, cablecasters, distributors and public broadcasters. Fair use also applies in the fiction film environment, but not necessarily to the same extent or in the same way.

As always, the central question is whether the new use is "transformative" -- i.e., whether it adds significant value by modifying or recontextualizing the original. For more understanding, including information on when you can use works for free (http://www.centerforsocialmedia.org/files/pdf/free_use.pdf) without even using fair use, why you (mostly) don't need to worry about trademarks (http://www.centerforsocialmedia.org/files/pdf/free_use.pdf), what is in the public domain (http://www.centerforsocialmedia.org/rock/backgrounddocs/copyrightterm.pdf), how fair use lawsuits (http://www.centerforsocialmedia.org/videos/sets/fair_use_case_studies) have been settled, and on how fair use has been employed successfully (http://www.centerforsocialmedia.org/videos/sets/fair_use_case_studies) in documentary film, visit centerforsocialmedia.org/fairuse

2. **RTF SAFETY POLICY**

Special safety precautions for your crew, actors and others in the area are required if you are undertaking any hazardous activities while filming, including but not limited to ANY driving or horseback/livestock shots, shooting in or around water or heights, or if you are using stunts, flames, pyrotechnics, squibs or simulated weapons (real weapons of any kind are never permitted). In addition, you must follow all federal, state and local laws and the rules of any venue or location at which you are filming regarding hazardous activities, including University of Texas at Austin rules if filming is done on campus.

Student filmmakers must submit a detailed safety plan to their course instructor and the RTF Technical Facilities Manager if a script or project involves driving or horseback/livestock shots, shooting in or around water or heights, stunts, flames, pyrotechnics, squibs, weapons or any other hazardous activities (this requirement applies to all shoots, including documentary projects, but please see the special guidelines for documentary driving shots below). It is the responsibility of the student to hire experts in the field and budget at least $600/day for expert consultation and on-set supervision if, in the judgment of the class instructor and the Technical Facilities Manager, such expert consultation or supervision is necessary.

Students should understand that driving while filming will be permitted only in strictly limited circumstances, such as on a private road or drive. In most circumstances, students who wish to undertake driving shots will be required to arrange for a police escort and a city permit. Monitors inside the vehicle will NOT be allowed while filming in a vehicle. Filming from the back of trucks is not considered safe and is not permitted under any circumstances.

Documentary filming of an interview while the interview subject is driving is only permitted if the cameraperson is secured in a seat belt and is not directing the driver of the car in any way, besides engaging in a conversation in which the driver/interviewee has been informed not to look at the camera or the interviewer at all during the interview. In addition, any filming from a vehicle, for drive-by B-roll, must be done by a cameraperson secured in a seat belt, where the driver is not being directed in any way by the director, so that they are driving as they normally would. As noted above, any documentary student planning on filming in any vehicle must submit a safety plan to their course instructor and the RTF Technical Facilities Manager.

Students who fail to comply with this policy will receive a failing grade in this class and will be barred from future access to RTF production and post-production equipment and facilities.

RTF 344M Interactive Digital Storytelling - Korsakow Film Project Reviews Using the 6 Thinking Hats Method

(examples from the original review model were removed to reduce the number of pages- Original review model in Annex 6. Students' writing in *bold italic*)

White—facts and figures

Audio is a little uneven… particularly the "likes" video could be brought up.

Red—an emotional response – no justification need or desired. No "becauses" needed.

Delighted. Your sense of humor is at once dry and completely genuine. It makes me safe. Safe to go where you take me.

Black—identifies problems in the work.

I am not sure if the structure is working exactly how you would like it to. I am interested to see the potential of the mind/body structure you have created.

Yellow—is about positives

I love your sense of humor. Also there is a kindness to your voice that allows you to successfully be wry and in a warm way… such a gift!

Green—Creative, open thinking. Not a judgment. Creative suggestions.

I wonder, how you could develop the greater structure of your project. I think however you did… it could be really fun to make it unexpected… for instance I think it could be too easy, too linear almost for "mind" oriented videos to be under mind and "body" oriented videos to be under body. Perhaps there is a clever way of playing with these themes using your sense of humor. Hmm….

Other Comments or Suggestions:

Great work! I had fun!

RTF 344M Interactive Digital Storytelling- Korsakow Film Project Reviews
Using the 6 Thinking Hats Method
Project Name or Producer Name:
Your Name:

White—facts and figures
(Example: Is it the proper format? Is it the correct aspect ratio? is it the correct length? Are the audio levels between the SNUs consistent?)

Red—an emotional response –no justification need or desired. No "becauses" needed. How does it make you feel?
(Example: It bored me. I found it very exciting. It made me feel sad.)

Black—identifies problems in the work. You identify one problem and you don't offer a solution or suggestion.
(Example: I don't understand what you are trying to say. I don't see a theme in the work. I am not engaged in the work. The video quality was not great.)

Yellow—is about positives
(Example: The editing really supports the topic. I think that I could use a staccato style like that in my next work. OR the cinematography is beautiful, that would be perfect for my next idea.)

Green—Creative, open thinking. Not a judgment. Creative suggestions.
(Example: What if you added natural sound to the sound track.? OR It might be interesting to show the progression of the day.)

Other Comments or Suggestions.

Excerpts from students' blogs

Collected in September 2012

The layout of paragraphs was condensed to reduce the number of pages most relevant or used excerpts are in **bold.** (Blogs were separated and numbered and names and usernames were removed or replaced to conceal person's identity; remaining data was written by students or blog system)

Blog 1

Final Blog Post

December 9, 2011

The main take away from this course is that for most projects you are not able to do by yourself"(…) **[Korsakow application] is easier to use than Flash and making a project in Korsakow would not take a whole lot of time once videos are ready to go.** (…) **I would recommend this class because it is all new territory and so there is a lot to learn about and discover about it.** This class has changed the way I view media in that there is this whole new realm of media which allows for and audience to interact with it.

Week 8

October 16, 2011

Overall I think it is a pretty cool program ([Korsakow]) where some interesting things can be done. I also found it to be fairly easy to use as there were no problems for me in terms of how to do things with the program. (…) Once in Korsakow when I tried to export the project, it said that it could not export successfully. All I did was close the program and try again and it worked. Other than that I did not encounter any problems.

My keywording strategy was somewhat random, but I wanted the videos to appear the same number of times. To achieve this I had to increase the SNU rating for some of the videos which had less keywords and so didn't play as much. I increased the rating for my UT place video, the Kim video, and my dislikes video. (…) I would use [Korsakow] this project again for sure. I think it is really cool to mess around with and you can do so pretty cool things with it.

Week 6

October 2, 2011

I think Korsakow is a pretty easy program

Blog 2

Final Blog Post - DEC 09, 2011

How did the Korsakow project help you to develop your thinking on interactive digital media? (…) **Korsakow taught me that building an interactive project can be both fun and accessible**. It need not be a gigantic pursuit that involves a great deal of technical background or expertise. What I enjoyed most about Korsakow is that it is relatively simple. Make your videos, upload them, and arrange them. Because of that, Korsakow is definitely a tool I will use in the near future (I have a project planned already). (…) **I would keep the general format of the class. I do agree more time could have been allotted to our flash based projects but I really like that we did have the time with Korsakow.** (…) "And one more thing, both yourself and Peter were always very committed to being certain we were on the right path and had what we needed. Both of you made it your business to ensure that a question was truly answered and understood before moving on. That has (in my experience) not been very common and I am very thankful for you both making that a standard.

untitled - OCT 17 2011

Considering I have been wanting to work with Korsakow for quite some time but continually putting it off because I assumed it would be really complicated, my overall reaction to completing the project is both relief and inspiration. Relief that it is not quite so difficult as I surmised and inspired for all the possibilities that are there to create further projects with it. (…) **I appreciate that the project was introduced a little bit at a time**. It was a great creative challenge to craft short videos that function like small shards, sharing reflections of ourselves. (…) **The process of importing, editing, and exporting the videos posed great challenges for me. Primarily this is because I elected to use Avid, which I am only just beginning to learn. In addition there is so much involving video formats and codecs that I just don't understand.** Moving on… **for the most part importing and arranging the videos in Korsakow was painless until the very end. Then I received multiple messages concerning errors with my videos.** Both Antonio and Peter (TA) were kind enough to lend hours of their time helping me get to the bottom of the issue. In the end I know the filenames and size differences in my videos were contributing to the complications. **I chose to create a kind of journey in my project, where people could use a "transit" option to leave a place or continue moving.** (…) **I really look forward to using Korsakow again soon.**

Project 4 - OCT 03 2011

"I was not aware that the software uses keywording as the source of it's mapping, to create relationships between videos. Because I like words (more than numbers) I am actually pretty thrilled about this. Somehow it makes the programs seem more friendly."

I did not find anything particular really confusing, but I can say when it came to widgets and adding a variety of options to the program, I got pretty confused. (…) **I am thrilled Korsakow is open source and FREE!!!**

Blog 3

Conclusion

09 Dec

The Korsakow project was a great way to start thinking about interactive digital stories in terms of video content acting together as a whole. I liked exploring the interface and finding out how to set the keywords as a strategy for the user to get a real experience. I do want to use Korsakow for future personal storytelling, similar to Martha's work, as a fun travel journal for other people to explore my personal journeys.

I would definitely recommend this course to other students. It has been my favorite class in my whole media education. This is due to a couple of reasons. A teacher who is engaged personally and professionally with interactive projects will always have a better understanding of teaching this complex topic and will be able to make it entertaining and educational. **I really enjoyed learning about interactive and *keywording* theory, exploring other interactive projects, working on practical projects and critiquing and being critiqued by class members.** I believe, we had a really great class dynamic. We respected each other's work, helped each other, complimented each other and developed constructive criticism that would help another developing one's work. Overall, the class was very well structured, fun, educational, and gave me a competitive edge for my future media career.

Week Eight: End Project

15 OCT

Korsakow gives you the possibility to express a subject through non-linear storytelling. The user is interactive and decides which clip he wants to see next, which gives the storyteller the possibility to direct and lead the user through the *keywording* strategy he or she decides.

I have had quite some challenges with Korsakow since it will not open on my laptop and so I always had to go to the university to work on my project. It would have been nicer to be able to work on it from home. I believe, the problem is that my Mac has OSX 5.6 instead of OSX 6, so it is an older version which is not compatible with Korsakow. I researched it on their website but couldn't find any other possibility than to upgrade, which my laptop would let me do. I just wish there was a way to use Korsakow on my operating system – even if it is not the newest one.

For the "work in progress" project I showed in class (which started with my dancing video) I had a totally wrong *keywording* strategy: I named every single SNU differently and gave it its name as the In-keyword. That way, I always had to put in numerous End-keywords, which made the project disorganized and confusing to work with. I then talked to a few people in class and found out that it is much better to have few keywords. I then thought about how to coordinate my videos and thought about past and present (since I have the pictures of me as a baby and as a kid). The two keywords I used for my film are "kid" and "now" – to differentiate between my self portrait from the past and the present. Three videos include my physical self: Me as a baby, me as a young kid and me know. These three are my transition SNUs, starting with me as a baby and transitioning from past to

present with the kid SNU ending with me now. As a strategy, the user would have to go through as many videos from my past as possible (with the lives set to 1) until the kid video comes up and transitions to now. I lowered the SNU rating of the Kid video of me feeding the toy elephant so it would be one of the later videos to show up, so that the user gets as much out of my past as possible. Even if the user does not see all my SNUs from the past, it's OK since more SNUs follow of the present. The End SNU also has a low rating, so it would also not be clickable right away.

I believe Korsakow is unique as it is since it gives the user a very different experience. Since the user is able to decide how he or she wants to navigate through the self-portrait of my life, I am only giving guidelines by setting a path that will go chronologically from past to present, but the user is the one who goes along that pathway, discovering the secrets along the way. I like how interactivity is explained in *Digital Storytelling* as "back-and-forth communication between the audience and the narrative material" (p.4) and how the users become "active players in the narrative" (p.5).

I would definitely use Korsakow again – if I finally get it to work on my laptop. I have a lot of footage of past travels that I would like to show in a way that the user feels like he or she is travelling with me, being part of the experience, deciding which path to take next.

Week Five: Wishes and Someone I Admire

24 SEP

Korsakow

Something I was not aware of in Korsakow is the way you can lay out your videos differently. After playing around and testing the software, I found that I could programm some video clips, so that they would show up in a different structure than the rest. For example, while half of the videos played 16×9 with the media above, the other half could have 16×9 with the media below. This is a very interesting feature. I am not sure if it will distract and confuse the user, but it is an interesting way to play with the outline of the set-up.

I explored the "full-screen button", which is one of the widgets on the Korsakow tool. You can put in the tool by dragging it onto the media page. There, you can position it, where you find it should have a relevant spot. I found it very interesting that you can use this button for the user to get the full experience of your short videos. I really thought it was a great button to put in. The only thing that I found a little bit annoying about it was that it has a weird bluish-green color that stands out. If a user does not want to use the "full-screen button", it seems like he is almost forced to do so, because it is so evident in the screen. Also, you can adjust the size of the widget to however big you want it. I will try to figure out how to use it best for my Korsakow project.

Week One: What is Interactive Digital Storytelling?

03 SEP

Determining what Interactive Digital Storytelling is can be quite difficult. The internet has redefined media and media use and so Interactive Digital Storytelling is a multifaceted innovation that originated through the means of digitalisation.

From my point of view, Interactive Digital Storytelling can be considered a hybrid between a film and a computer game: a pre-produced, non-linear narrative is available digitally to a user, who defines the storyline by actively deciding the outcome.

In class, we learnt that when it comes to the text of Interactive Digital Storytelling, an interactive story can be told digitally through the interface of the computer screen, keyboard, joystick etc., which is used by an audience that can manipulate or decide the actions of characters in a digital setting. Five main words describe Interactive Digital Storytelling: variability, hypermediality, multimediality, interactivity and textually softness. Variability means the changeable trait, hypermediality consists of connections, multimediality is the use of different media, interactivity is the physical interaction of a user with a text and textually softness refers to the open and mutable changes that can be made by the users compared to the hard and unchangeableness of a DVD.

An example for Interactive Digital Storytelling is The Wilderness Downtown, a google maps-adventure of Arcade Fire's song incorporated into a digital experience: the user types his home town into a box on the screen and then watches a figure run, followed by a flock of birds and a panoramic view of the city, underlined by Arcade Fire's song and an interactive element of writing a postcard to one's former self. Another great example is The Viral Sockpuppet Press, where users can alter a story by sending in YouTube videos. On this website, users can not only actively decide the way in which actions take place in a pre produced film, they can also contribute with user-generated content.

According to Carolyn Handler Miller, interactive storytelling is an ancient human activity, that was already used in prehistoric times. Even today, narratives are constructed by connecting the past, present and future. Handler Miller states in this context, story does not have to mean a work of fiction, but can be real life stories.

In Softvideography, Adrian Miles states the differences between hard- and softvideography and thus explains that the first step towards softvideo is to no longer to regard digital video as a delivery format, but to view it as a publication environment. Softvideo does not transport data, but is modeled on writing and film making practice. Miles gives insight into QuickTime as an important tool for softvideo. Each track is analog to nodes in a hypertext and so the tracks have a range of properties that can vary in speed, visibility, volume, size, colour, etc.

Overall, I have learnt a new definition of Interactive Digital Storytelling as softvideography, meaning that a user has the drive and possibility to alter a digital film and also has the chance to provide own material.

Blog 4

End of the year responses - December 9, 2011

Creative collaboration is key. Creative collaboration is very important to creating an imporessive project. Other individuals can bring skills and thoughts to the table that you never could have before. (…) I wish we could have spent more time with Flash, because Flash is a very complex

program and there is a lot of sophistication that goes into creating flash supported animation. (…) I would have like 2/3 of the semester be allotted to the Flash project, and 1/3 of the semester allotted to the Korsakow project. (…) **The collaborative element of the class was incredible, and it helped us come up with good ideas and mesh well as a group.**

Korsakow - October 17 , 2011

The korsakow project was very enlightening in that it expanded my appreciation for the effect that the media has on the audience. Telling a story or sharing a character is one thing, but if the audience can actually engage in the media and affect the future of the character then the investment that the audience member puts into the media manifests itself in their overall experience of the media. However, it is very difficult to create a format such as that while maintaining the interest of the audience. If the storyline is predictable or fails to be engaging, then it will be ineffective in grabbing the audience and creating a fanbase. Instead it would be another one of the many videos on the "ghost space" of the Internet. If no one likes it, it won't be watched. The idea of failing to entertain an audience puts a lot of pressure on the creative process.

While working with the Korsakow program one of my videos was "corrupted", or so the program stated and it made it impossible for everything to run properly. **After working it with some help from the lab aids, we decided that re-rendering the failed videos might solve the problem, and it did.** I've often run into problems with different file formats a lot because I bounce between final cut and adobe programs from time to time for film projects. I haven't learned enough to be professionally competent with the programs, but I have learned how frustrating it can be when a single file corrupts the overall project.

My keywords were very simple. One-word descriptions for the video the keyword was assigned too, any longer and they began to become hazardous for the project. Each video had one "IN" SNU and three or four "out" SNU's depending on the video and how many relations I believe it had. I didn't want to overdo it but each video is connected to every other video in some way, a lot like six degrees of separation. The relations between SNU's can be altered in as many different ways as you can imagine. The best way to make sure the relations are effective in spreading the message of the overall project is to experiment with the different combinations until the emotional chord that you were trying to find has been hit. If the SNU relations aren't bringing out what you may have wanted from the project, then the issue is most likely in the production of the media.

Without the time constriction for the videos in this project, I would definitely use this program again. It could create the audience interaction that film and television can't offer. I'd like to make a few short episodes based on the BBC program "misfits" and then create different storylines based on the decisions the characters make in the turmoil that the script provides. The Korsakow program would allow me to present my shorts in a way that allows them to control the outcome of the characters. The audience could view the video repetitively and they could expect a different outcome each time.

Week 3 – Production - September 12. 2011

I have more experience with Mac's Final Cut Pro, but I also just purchased the Adobe creative suite

for my computer, and I wanted to learn more about a program I'd never used. This video project seemed like a good way to learn so I decided to do all my editing in Adobe Premier. Opening the program felt different to me. I set up the scratch disks as well as I could determine and imported my footage. I made my four videos and saved them to my external hard-drive, and at that point I thought that I had done a decent enough job.

Blog Post 1 - September 10, 2011

While I deciphered the first reading the concept of breaking the "third barrier" stuck with me. Had experiences I had taken for granted, such as visiting old civil war battlegrounds and museums, as a kid, which in theory broke the third wall, been more valuable to me than the television programming I was engrossed in? Perhaps. Experiencing a living story such as the one performed by the Dogons would have been a more effective way of breaking the third wall. Television can only do so much in the realm of interactive entertainment, but digital could go that step further, and perhaps more.

Yet, further reading into the second assignment revealed another form of media that could go even greater distances. Hard copy is an un malleable form of media; it can't be interactive with the consumer. Soft copy, on the other hand, can be interactive on almost all planes. The story can change, the characters, the purpose, the original form of media that you push out onto the Internet could return to you as something entirely different. Joseph Gordon Levitt understands this concept and is pursuing a global creative community with his project, HITRECORD.ORG. The website has run for five years and in 2010 they became a professional open collaborative production company. Already he has thousands of different contributors on hundreds of collaborative projects, the majority of them being videos for the Internet which could be described as soft copy media.

The Internet is becoming the norm for social interaction, it has become ingrained in out society. The streets around campus are pretty quiet because most people are listening to music on YouTube or checking Facebook on their phones. My Word program wouldn't even let me spell "Internet" without it being capitalized. Everything seems to be moving towards it and money is poured into large internet companies. However unlike generations before us who built roads, Skyscrapers, produced steel, and Food, what are we producing for all of the money that's being put into digital communications? We're investing emotions into the Internet as well, the film "Catfish" demonstrates how misleading and heart wrenching the digital world can be very effectively.

I'd like to become more computers savvy. More experience in dealing with the internet and different programs could never hurt my chances in this economy. It would also be good to become familiar with something that still mystifies me.

Blog 5

Class Wrap

December 9, 2011

3. **Know your audience: As creators, we often get selfish with our projects. We assume that everyone will love it because it's our baby, but the truth is that you need to design and create with audience in mind.**

4. **When a project starts to overwhelm you – draw a mind map**. **That was the case with the Korsakow project, which was probably the trickiest project I've ever had to plan out.** It really came down to getting a piece of paper and working through the project – planning every little detail.

5. Always look to others for inspiration. This was a lesson I really learned during the last screening. After watching some of the other fabulous projects, I couldn't help but get inspired to do more with my own.

Korsakow

The Korsakow project was a nice, albeit a little rushed, introduction into interactive storytelling. I will say that the software is relatively user-friendly, but putting together the project itself was tough. There were a few other project to get inspiration from, but to me there's no real guide map to making a good interactive project, you really just have to go out, make mistakes and learn from it. That being said, I think **Korsakow really made me realize how utterly complex it can be to craft a good interactive story**. Not only from the production standpoint (you really do have to make a lot of videos) but from the storytelling standpoint. You're trying to predict what paths the viewer will take and at the same time making sure that the story you're trying to tell is legible. So really, I think Korsakow was a great experiment and a good kick into the world of interactive digital storytelling.

First **I would change the overall schedule a little bit. I would shorten up the Korsakow project by a week or two and reduce the number of videos you have to produce for it**. That would give us more time with the Flash project, which I feel was the more fun but also more demanding project.

Second, **I would allow students to come up with their own original Korsakow projects at the onset, instead of making them commit to the personal portrait assignment**. A lot of the Korsakow project I watched were incoherent in their storytelling (my own included), and so I think by letting students plan out their own stories from the beginning, you will get better projects in the end.

Summarizing my experience with Korsakow

OCTOBER 16, 2011

Korsakow is a very intriguing software to use and play around with, but after completing my first project with the program, I can see now that it takes a lot of practice and planning to put together a polished project. **While the software itself is relatively easy to understand and use, putting together a multimedia story is extremely challenging**, especially for someone who is relatively new to the medium. Technically, I liked the software's simplicity in both design and user-friendliness. **Most softwares can be a pain to pick up and learn in such a limited time, but with the help of the Korsakow website, I was able to understand the software realtively quickly. But then again, most of my learning came from simply playing around with the program**

itself.

When it came down to putting together the videos for my project, I learned the hard way that you need to do extensive planning before actually jumping into the process of SNUfying the videos and connecting them. **My rough draft was a mess. Videos weren't formatted correctly. SNU's did not connect in a way I wanted them too. And overall, the project was lacking a sense of narrative coherence. So I decided to simply blow it all up and start from scratch. Only this time, I used an exercise we did in class. I pulled out a piece of paper and made a web, splitting all the videos up into their own respective categories and at the same time, brainstorming keywords that could summarize them.** I settled on the overall theme – Me – and worked outwards from there with three branches – stories, places and mind & body. I then grouped my videos based on what branch they could best settle into. Some of the other keywords I used were: physical, 360, birthdays, SOCO, Mom, parasailing, sailing, shower, show, wish and spiritual.

Having seen other projects, I now appreciate the concept of finding a good start and end SNU. I understand that non-linear storytelling puts an emphasis on fluidity and flexability for the viewer/particpant, but it is my opinion that you still need to set rules and create boundaries so that the player isn't wandering around aimlessly. A good digital story must be navigable, as said in "Digital Storytelling," and a good digital storyteller must lay solid groundwork so that the audience can get where they want to go. I understand that nonlinear storytelling is supposed to be in the hands of the player, but as a creator we need to make sure that they aren't getting lost in the woods. Watching other classmates Korsakow projects, I saw that they were all interactive but aimless at the same time. As a viewer, I would go through the projects without seeing any explicit paths or end goals. Now that's fine if that was their intention, but as a viewer I want to find an ending. So I took that mentality and tried to apply it to my own project. My pathways were crude, but at least there was an end to it all.

In the end**, I found my experience with Korsakow to be challening, occasionly frustrating but ultimatly promising**. My project was not a breathrough in digital storytelling by any means, but it was a learning experience. It opened my eyes to what could be done, and spawned a number of ideas for future multilinear projects. One passion project I have in mind is a fictional story about a crime committed at a mansion party. I've always been a fan of murder mysterys, and think that Korsakow could be a cool tool to use for this, as it will allow players to play as a detective and try to solve the case on their own path. It's an ambitious project, but I can see the final product in my head, and with Korsakow, it's a thing of beauty.

Someone I Admire and My Wish…

OCTOBER 3, 2011

KORSAKOW: THOUGHTS ON KEYWORDING

"Stories without an opinion." That's what Florian is thought are on the Korsakow program. Through use of keywording to connect your media, one can achieve a storyline that is weaved together by the viewers. I find the process of keywording very intriguing myself, but complicated at the same time. The questions are no longer editing-related, they are more storyline related – i.e. how do I let my viewers unravel these videos and images?

As easy as the Korsakow software is to pick up and use, the art of crafting a multilinear project is extremely complex. For me, the first step is figuring out the themes of the piece and translating them into short keywords that will sum it up. My project is all about me, and I decided to divide the project into three main categories that in turn would branch out to other sections of the project. These initial keywords are “My Self,” “My Places” and “My Story.” From there, viewers will have to decide which parts of me they would like to explore.

In formatting this piece, I’m trying to be cautious of creating too many keywords. As shown in the “Kosakow Field Experience” writing, too many keywords can doom a project. Simplicity is tantamount, especially in a beginner Korsakow project. **I found the exercise in class in which we mapped out our projects (like a web) to be very useful.** In fact, my project has started out on paper, and following it’s instructions has made me more disciplined when putting it all together digitally. Overall, though, I’m still trying to put my head around this idea of laying out multiple stories that can be understood by the viewers. In other words, I’m still trying to become a master of multilinear storytelling.

Florian talks about “masters of the story” and how Koraskow has effectively removed that power (or burden) from the creator and has given it over to the viewers. This is a great feature for the viewers of course, but for the creator it’s difficult to hand over some authorship. The truth is, that while we have grown up in a digital society where the line between creators and users has become increasingly blurred, we creators are still reluctant to hand over any power to the audience. That may sound selfish and or arrogant but it’s true. And while we can try to influence the journey our audience takes by poking and prodding them in a pre-determined path, it’s ultimately their decision. The masters must lay down a network of paths and trust that our audience will choose the right path and reach the finish line, safe and sound. I’m starting to feel like a parent, trying to guide my kids through life…

In fact, this whole process has made me feel like a parent. I’m nurturing this story and watching it grow into something greater than when I started. Hopefully all turns out well!

Blog 6

Week 8

October 16, 2011

The Korsakow project allowed me to think in a non-linear way to create a complete project. It also allowed me to concentrate on interface which was a refreshing creative experience.

Some of the challenges I experienced were with the key wording and making sure that all my videos were going to be viewed. The way I solved this issue was making sure that my keyword structure was set up into 2 phases. The first phase effectively acted as a semaphore. Channeling the viewer into phase 2 which filtered out like roads. I connected this idea to synapses, which became the idea for interface.

The Keywords I used for phase one were Red Green and Yellow. Phase two keywords were – warm cold and hot. I related the temperatures to the way it made me feel. I then gave each SNU one life and I kept them at the same rating.

For me one of the unique aspects with digital story telling and this project relates to the ability for the user to interact directly with the story. In korsokow the user dictates the order of the SNU play.

I have already planned on using Korsakow again for project that I have had on the back burner for awhile concerning computer based training and user interaction.

Blog 7

Class Reflections

December 10, 2011

5) If you could change two things about the course what would they be? Please explain your answers.

1. I would allocate more time for the Flash project and teach coding fundamentals as it would be a valuable skill to have.

2. For the Korsakow project, I like the idea of working with groups to speed the process.

6) If you could keep two things, what would they be? Please explain your answers.

1. I'd keep the thinking hats exercise and the peer critiques we did of the other projects. It was helpful to have feedback from different people and have suggestions of what to change or things to consider when working on the project.

2. **The self-portrait was a good idea that I think would be easy to work with. I'd keep that but maybe make the prompts more flexible as to interpretation so that students aren't so limited and their videos can better fit the vision they have for their entire Korsakow project**.

Week 8 Reflection

October 17, 2011

The Korsakow software has introduced a new way of thinking…thinking in a non-linear fashion. I like how the non-linear format inspired me to think of a way to tie the videos together somehow. I am sure that with more time to think on the actual connections, I could think of a better way to tie all the SNUs together. I like my current idea, so I plan on finessing it before the end of the week to turn in as my revised version.

Through this Korsakow project, I am more willing to see smaller, routine details and activities in a more interesting ways. What is routine for me can have an interesting video treatment when I take the time to look at it differently and more creatively. There's something interesting in every little

action or detail and abundant opportunities to tell stories. That's makes me inspired and excited to make more videos.

I did get an error message at one point. The error was caused by a change in the file names. I had changed the name of my main folder and then my media was unable to be found. I wasn't able to open the project file anymore, so I deleted the old file and started again since I had not done much work yet. There should be a feature that gives authors the option to reset the location of their media, like Final Cut does with the reconnect media option.

I also got errors messages upon open my project file and did not know what the problem was as I was careful not to rename or move any folders. I would close and reopen the file and then it would work fine.

The key words I used for my K-film: band, dog, family, hate, like, me, past, photography, place, present, and rock. I had only a few keywords but added more to connect my start SNU with several videos at once. The start SNU is a video of my "likes" and I used it to introduce the various aspects of myself. It introduces the topics in my self-portrait and gives the user a sense of who I am.

Aspects of digital media in my projects were that the film was interactive, the narrative was non-linear, the user was able to see my past and present, and participatory (the user was able to choose which aspect of me they would see and also choose the order)

Yes, I would use the software again for video projects. I think that it does work well with shorter videos. The format could work for a journalism piece that includes video profiles of certain individual with a shared connection. It would definitely make the viewing process interesting by adding the user elemen.

Blog 8

Speaking of last blog post, tears and the lack of cookies…

December 9, 2011

Describe five of your "take-aways" from the course. These may be technical, aesthetic, related to project management, or whatever is relevant to your experience in the course.

I think if I had to choose five "take-aways" from this class they would be these:

1 . Korsakow. Even though at the beginning I thought it was a weird and ugly-looking tool, looking at all the possibilities it provides I definitely want to go deeper into its usage and exploit it as a filmmaker.

2. Knowing about myself. Even though, this wasn't probably something the assignment was aiming for, getting prompts every week about personal things and making me think of what I like, or don't, what I dream of, etc. Analyzing who I am and putting it into short videos and looking at everyone else's personalities was very interesting.

5. Cookies. Even though this might seem like a joke, the "cookie factor" in this class was undoubtedly one of the reasons the class bonded and when a small class bonds, the creative flow is better. Not to mention that bonding and becoming friends made the participation with each other at the end something of a pleasant experience.

How did the Korsakow project help you to develop your thinking on interactive digital media?

Korsakow was an interesting piece of software because even though it was simple to use it had an ocean of possibilities to be exploited. Ever since I used it I've been thinking differently of my filmmaking. I now like the idea of making things that the audience can interact with instead of just sitting through it.

Week 8 Korsakow reflective essay

November 7, 2011

Opening the Korsakov software I had no idea where to start or what to do with it. We were told, "Play with it, try and figure it out" but its simplistic interface and its grey, old-looking workspace made me feel really uninterested. However, as soon as I watched a few Korsakov films and realized how interactive they could be and how different they all were I realized that even though the software looked like it had been made for Windows 95, the program had a lot of potential.

After using it I realized that it really pushed me into thinking a little bit more about the structure of my films and helped me realize that I need to be more organized and have a better idea of what I want to do before I do it.

When working with the program I encountered the problem that many of us encountered, which was figuring out a structure for our project and finding a way to have logical SNUs. My organizational pattern was flawed and not even I understood what the logic behind it was. It took me a while to decide on how to format it. A big problem I had was a confusing detail that didn't really affect the software itself. When playing my Korsakov film online and then playing it again I would notice that the film would have an error opening up. It took me some time and several consults to both my T.A. and my professor to realize it was only a matter of having the film finish so that when I reopened the website it wouldn't start where it had stopped.

Week 6 and stuff… Wishes, admirations, keywording?

Keywording Confusions…

Now that I'm working with Korsakow I must admit I feel really confused and a little bit annoyed by its rules. It seems to be pretty easy but making a film happen when the key words need to make sense not only to you but to others is really giving me a hard time. So far the only idea that I've came up with is the idea of diving my SNUs into "old videos" and "new videos" easily splitting my high school Youtube days and my UT film student days. However, the flow there wouldn't be too good and would leave the audience with a really boring set of screens to click without having any real interest in them. I was considering adding the keyword Spanish and English but then I realized that only my archival videos are in Spanish so that division doesn't completely help to do

anything more fluent.

Another problem that I have is getting away from my natural idea of telling a story from beginning to end, telling the audience where to begin, how to end, and what to see. As a filmmaker and storyteller I've gotten used to that, but now that I've been introduced to Korsakow I am being forced to change the way I see things and the way a story is told. As Master and Medium says: I need to let go of being a Master and start becoming only a Medium. I guess the idea of letting go of the power of the Master seems a little scary for me because I feel like I need to tell a story or else the audience will not be pleased. The problem with that is, that if I become a Medium, the audience will tell its own story and create its own way of looking at what I'm presenting. I guess to me this feels intimidating and weird because even though I've given it much thought before I have never really forced myself into doing something like this.

Now, if we consider that I've gotten past the point of "struggling" with being the Master and letting go of that power, I find myself having another issue" Start and End SNUs. Why? Because they force me to start and end in a way, and the way a story starts and the way a story ends, are always the most relevant parts of the story in my opinion. You feed them what to think in the beginning and you leave them with that after-taste in the end. Therefore, being forced to find the correct End and Start SNUs seems to me like I am not leaving that Master power and I'm not precisely embracing the ways of becoming the Medium.

What I need to do and what I want to do with this film is still a little unclear to me, because in a sense I need to be telling the story of who I am, but by showing bits and pieces of my personality in a scattered order, I think the story can get lost in the clips themselves. How good a Medium I become can only be seen if at the end, the audience remembers what they saw, more than what they saw last. I'm still very confused.

Blog 9

Final Blog Post

"I think the Korsakow project has been very beneficial to me. While I don't know how often I will actually use Korsakow in the future, it helped me to look at the overall picture, rather than just at the individual clips. I learned how to piece things together and how to connect things that might not be coherent with each other. The editing of all the clips helped me to get better in Final Cut Pro, which I think is very important to succeeding in film school and in Hollywood.

[Professor], thanks for a great semester and an incredible class! I've learned so much and I enjoyed coming to class each day (which is very rare for me)."

Students' Final Questionnaire

1. Please select the age range relative to your age:

#	Answer		Response	%
1	18 to 20 years		3	25%
2	21 to 23 years		5	42%
3	24 to 26 years		1	8%
4	27 to 29 years		1	8%
5	30 to 32 years		2	17%
6	33 years or more		0	0%
	Total		12	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	2.50
Variance	2.09
Standard Deviation	1.45
Total Responses	12

2. Please select your gender:

#	Answer		Response	%
1	Male		8	67%
2	Female		4	33%
	Total		12	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.33
Variance	0.24
Standard Deviation	0.49
Total Responses	12

3. Do you have a personal laptop?

#	Answer		Response	%
1	Yes		11	92%
2	No		1	8%
	Total		12	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.08
Variance	0.08
Standard Deviation	0.29
Total Responses	12

4. Do you have a personal desktop where you live?

#	Answer		Response	%
1	Yes		5	42%
2	No		7	58%
	Total		12	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.58
Variance	0.27
Standard Deviation	0.51
Total Responses	12

5. Do you have a mobile phone with camera?

#	Answer		Response	%
1	Yes		11	92%
2	No		1	8%
	Total		12	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.08
Variance	0.08
Standard Deviation	0.29
Total Responses	12

6. Do you have a digital video camera?

#	Answer		Response	%
1	Yes		9	75%
2	No		3	25%
	Total		12	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.25
Variance	0.20
Standard Deviation	0.45
Total Responses	12

7. Do you have internet connection where you live?

#	Answer		Response	%
1	Yes		11	92%
2	No		1	8%
	Total		12	100%

Statistic	Value
Min Value	1
Max Value	2
Mean	1.08
Variance	0.08
Standard Deviation	0.29
Total Responses	12

8. On an average day in April 2011

#	Question	Less than 1h	1 - 2 h	2 - 3 h	3 - 4 h	4 - 5 h	5 - 6 h	More than 6h	Responses	Mean
1	Studying books?	4	5	2	0	0	0	0	11	1.82
2	Studying with your friends?	8	2	1	1	0	0	0	12	1.58
3	Studying online?	2	4	5	1	0	0	0	12	2.42
4	Searching in the web?	0	2	2	5	2	0	1	12	3.92
5	Watching videos online?	1	5	3	1	2	0	0	12	2.83
6	Watching TV?	4	4	2	1	1	0	0	12	2.25
7	Listening to music?	2	1	2	2	3	1	1	12	3.83
8	Playing video games?	9	1	0	1	0	0	1	12	1.83

Statistic	Studying books?	Studying with your friends?	Studying online?	Searching in the web?	Watching videos online?	Watching TV?	Listening to music?	Playing video games?
Min Value	1	1	1	2	1	1	1	1
Max Value	3	4	4	7	5	5	7	7
Mean	1.82	1.58	2.42	3.92	2.83	2.25	3.83	1.83
Variance	0.56	0.99	0.81	1.90	1.61	1.66	3.61	3.42
Standard Deviation	0.75	1.00	0.90	1.38	1.27	1.29	1.90	1.85
Total Responses	11	12	12	12	12	12	12	12

9. For each technologies on the left please indicate how skilled you consider yourself using each technology?

#	Question	Beginner	Intermediate	Expert	Never used	Responses	Mean
1	Word Processing (MSWord, etc.)	0	3	8	0	11	11.64
2	Spreadsheets (Excel, etc.)	2	7	2	0	11	21.45
3	Presentation software (PowerPoint, Keynote, etc.)	2	4	5	0	11	13.82
4	Concept Maps (Inspiration, Visio, cmap, etc.)	4	2	2	3	11	7.55
5	Image creating /editing application (Photoshop, Illustrator, iPhoto)	2	4	5	0	11	13.82
6	Audio creating /editing application (Audacity, GarageBand)	4	5	2	0	11	16.00
7	Video creating/editing application (iMovie, MovieMaker, Premiere, Final Cut)	0	5	6	0	11	16.73
8	Web pages creating /editing application (Dreamweaver, iweb, googlepages)	5	2	2	2	11	7.64

10. Your opinion on digital technologies. For each of the statements on the left, please indicate your level of agreement.

#	Question	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Responses	Mean
1	I get more actively involved in classes that use technology.	5	4	1	1	0	11	4.18
2	The use of technology in my classes improves my learning.	5	5	1	0	0	11	4.36
3	I become more off-task as more technologies are used in class.	1	4	4	2	0	11	3.36
4	The use of technology in my classes improves my learning.	2	5	4	0	0	11	3.82
5	I read and study better online	1	0	6	4	0	11	2.82
6	I like using computers in class	1	7	2	0	1	11	3.64
7	I believe most of what I watch on TV	0	0	4	4	3	11	2.09
8	I believe most of what I read in books	2	4	3	2	0	11	3.55
9	I believe most of what I read online	0	4	2	5	0	11	2.91
10	I believe most of what I watch online	0	2	6	3	0	11	2.91

11. Your activity last semester (January to Jully)

#	Question	Never	Monthly or less	Weekly	Daily	Several times a day	n	Mean
1	Use a search engine to find information (Google, Yahoo!)	0	0	0	4	8	12	4.67
2	View or listen to music or videos (YouTube, hulu, Limewire)	0	0	0	7	5	12	4.42
3	Follow podcasts and/or download music or videos	1	4	5	0	2	12	2.83
4	Use the school or local library website	2	5	3	2	0	12	2.42
5	Participate in social networking websites (Facebook, MySpace)	0	2	0	4	6	12	4.17
6	Play video games online connected to other players (World of Warcraft, Poker, Halo, Call of Duty, Runescape etc.)	9	1	0	1	1	12	1.67
7	Participate in online Virtual worlds (Second Life)	12	0	0	0	0	12	1.00
8	Share photos or videos (blogs, flickr, podcasts, vodcasts)	1	5	3	3	0	12	2.67
9	Use internet on your mobile phone	3	1	1	1	6	12	3.50
10	Read / Send email	0	0	0	4	8	12	4.67
11	Read a blog, a wiki, and/or an online discussion forum	1	2	4	1	4	12	3.42
12	Write/Comment on blog(s), a wiki, and/or online discussion forum	2	3	4	1	2	12	2.83
13	Participate in text-based instant messaging (ichat, aim, gmail chat, facebook chat)	0	1	3	3	5	12	4.00
14	Text messaging on phone	0	0	0	2	10	12	4.83
15	Participate in Online Audio/Video interactions (ichat, Skype)	2	3	4	1	2	12	2.83
16	Tweet / Follow on Twitter	4	0	3	1	4	12	3.08

#	Question	Never	Monthly or less	Weekly	Daily	Several times a day	n	Mean
1	Use a search engine to find information (Google, Yahoo!)	0	0	0	4	8	12	4.67
2	View or listen to music or videos (YouTube, hulu, Limewire)	0	0	0	7	5	12	4.42
3	Follow podcasts and/or download music or videos	1	4	5	0	2	12	2.83
4	Use the school or local library website	2	5	3	2	0	12	2.42
5	Participate in social networking websites (Facebook, MySpace)	0	2	0	4	6	12	4.17
6	Play video games online connected to other players (World of Warcraft, Poker, Halo, Call of Duty, etc.)	9	1	0	1	1	12	1.67
7	Participate in online Virtual worlds (Second Life)	12	0	0	0	0	12	1.00
8	Share photos or videos (blogs, flickr, podcasts, vodcasts)	1	5	3	3	0	12	2.67
9	Use internet on your mobile phone	3	1	1	1	6	12	3.50
10	Read / Send email	0	0	0	4	8	12	4.67
11	Read a blog, a wiki, and/or an online discussion forum	1	2	4	1	4	12	3.42
12	Write/Comment on blog(s), a wiki, and/or online discussion forum	2	3	4	1	2	12	2.83
13	Participate in text-based instant messaging (ichat, aim, facebook chat)	0	1	3	3	5	12	4.00
14	Text messaging on phone	0	0	0	2	10	12	4.83
15	Participate in Online Audio/Video interactions (ichat, Skype)	2	3	4	1	2	12	2.83
16	Tweet / Follow on Twitter	4	0	3	1	4	12	3.08

12. On an average day during this project (Aug 24 to Sept 13)

#	Question	Less than 1hour	1 - 2 h	2 - 3 h	3 - 4 h	4 - 5 h	5 - 6 h	More than 6hours	n	Mean
1	Studying books?	7	1	2	2	0	0	0	12	1.92
2	Studying with your friends?	10	1	0	1	0	0	0	12	1.33
3	Studying online?	2	3	5	2	0	0	0	12	2.58
4	Searching in the web?	0	3	2	5	0	1	1	12	3.75
5	Watching videos online?	2	5	5	0	0	0	0	12	2.25
6	Watching TV?	5	5	1	1	0	0	0	12	1.83
7	Listening to music?	2	3	2	2	1	1	1	12	3.33
8	Playing video games?	9	1	0	0	0	0	1	11	1.64

Statistic	Studying books?	Studying with your friends?	Studying online?	Searching in the web?	Watching videos online?	Watching TV?	Listening to music?	Playing video games?
Min Value	1	1	1	2	1	1	1	1
Max Value	4	4	4	7	3	4	7	7
Mean	1.92	1.33	2.58	3.75	2.25	1.83	3.33	1.64
Variance	1.54	0.79	0.99	2.39	0.57	0.88	3.70	3.25
Standard Deviation	1.24	0.89	1.00	1.54	0.75	0.94	1.92	1.80
Total Responses	12	12	12	12	12	12	12	11

13. Regarding your overall activity. For each of the statements on the left, please indicate your level of agreement.

#	Question	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n	Mean
1	I enjoyed the overall learning activity where we developed interactive movies.	5	6	0	0	0	11	4.45
2	The technical support was adjusted to my needs.	3	5	2	1	0	11	3.91
3	I was satisfied with the movie we developed.	4	3	3	1	0	11	3.91
4	The activity increased my motivation to study online.	3	4	3	1	0	11	3.82
5	The tasks were challenging.	3	6	1	1	0	11	4.00
6	I enjoyed doing the activity.	5	6	0	0	0	11	4.45
7	The activity was very demanding.	3	3	1	4	0	11	3.45
8	I considered the activity was a waste of time.	0	1	0	7	3	11	1.91
9	I enjoyed most of other students' projects.	2	8	1	0	0	11	4.09
10	I could understand other students' project keywording strategies.	3	5	1	2	0	11	3.82
11	I believe I learned something with other students' work.	2	7	1	1	0	11	3.91

14. Your activity during this project (Aug 24 to Sept 13)

#	Question	Never	Monthly or less	Weekly	Daily	Several times a day	n	Mean
1	Use a search engine to find information (Google, Yahoo!)	0	0	0	4	8	12	4.67
2	View or listen to music or videos (YouTube, hulu, Limewire)	0	0	0	7	5	12	4.42
3	Follow podcasts and/or download music or videos	1	4	5	0	2	12	2.83
4	Use the school or local library website	3	6	0	3	0	12	2.25
5	Participate in social networking websites (Facebook, MySpace)	0	1	0	5	6	12	4.33
6	Play video games online connected to other players (World of Warcraft, Poker, Halo, Call of Duty, Runescape etc.)	9	1	0	1	1	12	1.67
7	Participate in online Virtual worlds (Second Life)	12	0	0	0	0	12	1.00
8	Share photos or videos (blogs, flickr, podcasts, vodcasts)	1	4	4	3	0	12	2.75
9	Use internet on your mobile phone	4	0	0	1	7	12	3.58
10	Read / Send email	0	0	1	3	8	12	4.58
11	Read a blog, a wiki, and/or an online discussion forum	1	1	4	1	4	11	3.55
12	Write/Comment on blog(s), a wiki, and/or online discussion forum	1	3	4	2	2	12	3.08
13	Participate in text-based instant messaging (ichat, aim, gmail chat, facebook chat)	0	2	2	2	6	12	4.00
14	Text messaging on phone	0	0	1	1	10	12	4.75
15	Participate in Online Audio/Video interactions (ichat, Skype)	2	5	3	0	2	12	2.58
16	Tweet / Follow on Twitter	4	0	4	0	4	12	3.00

15. Regarding your internet and social networking experience, please indicate your level of agreement for each of the statements on the left.

#	Question	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n	Mean
1	It was difficult for me to find media online.	1	0	0	6	4	11	1.91
2	The Internet was useful to exchange information with	6	5	0	0	0	11	4.55

	others.							
3	I could find ways to check the quality and accuracy of the media I chose for my project.	2	6	2	1	0	11	3.82
4	The teacher helped to develop my project.	1	8	2	0	0	11	3.91
5	Online communication with the teacher was appropriate.	2	7	2	0	0	11	4.00
6	It was easy to share media and information.	2	9	0	0	0	11	4.18
7	Team work was good.	1	4	6	0	0	11	3.55
8	I used online forums to change information out of the class.	0	4	4	3	0	11	3.09
9	I feel more aware of potential risks when using the internet.	0	4	6	1	0	11	3.27

16. Regarding your editing and media management experience, please indicate your level of agreement with each of the statements on the left.

#	Question	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n	Mean
1	I had no trouble editing the media I wanted to use.	7	1	0	3	0	11	4.09
2	It was hard to develop concept maps or keyword strategies.	1	6	3	1	0	11	3.64
3	I learned a lot watching lots of videos online.	3	4	3	1	0	11	3.82
4	I easily developed concept maps of the topics I wanted to address.	1	6	1	3	0	11	3.45
5	It was hard to choose keywords for tagging the media I wanted to use.	2	5	1	3	0	11	3.55

Statistic	I had no trouble editing the media I wanted to use.	It was hard to develop concept maps or keyword strategies.	I learned a lot watching lots of videos online.	I easily developed concept maps of the topics I wanted to address.	It was hard to choose keywords for tagging the media I wanted to use.
Min Value	2	2	2	2	2
Max Value	5	5	5	5	5
Mean	4.09	3.64	3.82	3.45	3.55
Variance	1.89	0.65	0.96	1.07	1.27
Standard Deviation	1.38	0.81	0.98	1.04	1.13
Total Responses	11	11	11	11	11

17. Regarding your experience using the Korsakow application, please indicate your level of agreement with each of the statements on the left.

#	Question	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	n	Mean
1	I easily adapted to Korsakow's interface.	5	2	1	2	1	11	3.73
2	Linking all the videos together helped to have a broader perspective on difficult concepts.	4	5	2	0	0	11	4.18
3	I feel that I learned very little in this activity.	0	1	2	8	0	11	2.36
4	I feel that I am now able to build interactive movies by myself.	5	5	0	1	0	11	4.27
5	I had no trouble editing the several different media I wanted to use.	6	3	0	2	0	11	4.18
6	I had no trouble editing the interface for the my project.	4	3	0	3	1	11	3.55
7	I hope to use Korsakow application for other school projects.	4	6	1	0	0	11	4.27
8	I hope to use Korsakow application out of school.	6	4	1	0	0	11	4.45

18. What did you find that worked well in this activity?

Text Response
The overal interface itself was easy to understand and use.
Good questions
The keywording was powerful and easy to use to me. It was a concept I grasped easily enough, so I enjoyed playing with them.
The fact that we spent time Crating the content before starting with Korsakow
I think structuring the project from small videos we had made over the semester gave each piece great structure to evolve from. I particularly liked the practice of making small videos.
It was ideal to have videos of a short length...it helped with focus and production-wise, was easier to handle on the tight deadlines we had. And the video critiques by classmates were also very helpful. Also, the self-portrait aspect of the project allowed us to be very creative with our videos.
The layout and instructions. The interface was semi user friendly.
The interface

19. What did you find that did not work well in this activity?

Text Response
Trying to piece together videos into a coherent narrative was difficult.
Nothing
Exporting was a huge hassle, and free software does not pay for a great response time from "customer service". I ended up having to rebuild my entire project from scratch to satisfy the codec gods.
No Comments
Keywording strategy and structure of the korsakow was not emphasized until the very end. I think this came as some surprise to students who did not really understand the concept of interactive, nonlinear video.
It was difficult to have all the videos tie together in a story format or since Korsakow is nonlinear.
My organization.
the 4 archive videos did not fit well into my project

20. What would you suggest to make this activity better?

Text Response
Instead of assigning random topics to make videos about, let the student format their own videos and projects based on a singular theme at the very beginning.
Nothing
Really, the only problem was the lack of support. Collecting the issues people encountered and the solutions used to overcome them into a wiki would not be a bad resource.
Review really quick Korsakow at the beginning so we can have a better understanding of the big picture
I think it would have been better to analyze, and really discuss what makes a successful korsakow... and perhaps the various uses for korsakow. I think it is such an open... variable platform that is so useful for many kinds of projects. Emphasizing and exploring that would be useful.
Sometimes I did not care for the video prompt, but if there were alternative prompts, it may have been easier to get started with the work.
more one on one with students struggling
more freedom

Participative observation protocol

(Requirements tasks: download application, open application, a select 5 video segments, convert them to .mov or Mpeg4 filetype, selection of some keywords related to the segments)

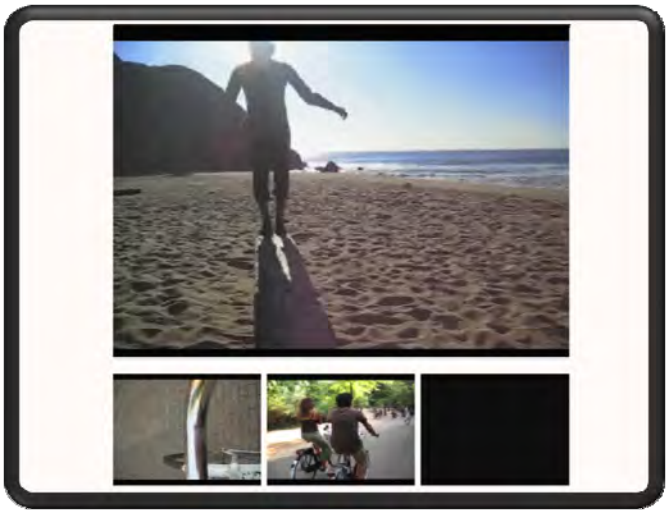
Objective of the observation is to evaluate the usability of the application Korsakow. User will be asked to perform some actions to develop a personalized K-Film (Users will be asked to think aloud as they perform the asked tasks. The idea is to verbalize all the action the user does with the mouse or key board. As *clicking, dragging, writing* in order to *open menus* or *open, copy, delete files* or *change names*)

1. Drag and drop movies to the application
2. Give titles to each segment
3. Set In-Keywords and out-Keywords for each segment
4. Save and publish the movie
5. Start the K-Film and go through the options
6. Set time for some out-Keywords
7. Change the interface layout adding one new thumbnail
8. Save and publish the movie
9. Start the K-Film and go through the options

K-Film example 3

Project developed by one of the students in 2011 (University of Texas). Courtesy of the author.

To open project double click on the file KFilm example3.html in the folder A10 - K-Film example 3 in the CD-ROM provided with this thesis (The project will need *Adobe Flash Player* to run).



Focus group script

(Previous action: choosing a topic for the project)(Required material: paper and pen)

Discussion

Multimedia

1. Have you used YouTube to learn anything? What?
2. Have you played any game where you have learned important things about “real” life? Whish game? Did you enjoy it? (History, politics, geography)
3. Are you familiar with the interactive movies? Do you remember any that you liked/not liked? Why did you like it/not like it?

Web design

1. What would be your criteria to evaluate a web site?
2. Are you familiar with web structures?
3. Have you ever built a web structure? Have you used any applications to do it?

Semantic Web

1. Have you ever used concept maps applications? (CMaps, Veu or Personal Brain)
2. Are you familiar with the term semantic web? (tagging, categories)

Web awareness

1. What web sites would you use to search for video about interactive storytelling issues?
2. How would you be sure that what you are being told in a website is true and accurate?

Activity

1. In the middle of a paper sheet write the name of the project
2. Write 3 keywords for the project that you find may be common to all of your colleagues
3. Pass it to the buddy to your right
4. Write 3 other keywords related to each of the 3 keywords already written
5. Return the sheet
6. Draw connections between all the keywords
7. Give numbers (1 to 3) to each keyword accordingly to the level of difficulty you believe others may have to understand the concepts related to them.

Professor Initial Interview of 2011 (transcript)

Lisbon, October 29th and December 6th of 2011

The interview was made in Portuguese. Used answer was translated by the author along the text and is presented in **bold** (**P10**).

Uso de tecnologias

Investigador - O que achas em relação ao excesso de uso de tecnologias? Achas que muito uso de tecnologia um dia poderá substituir o papel dos professores? Demasiada informação a circular pelo mundo fora? Se achas que isso poderá alguma vez substituir os professores?

Professora 1 - Acho que uma tecnologia não substitui os professores. Os professores não são as Pessoas que vão pura e simplesmente trazer as tecnologias para as aulas, mostrar aquilo que eles já sabem ou o que vem nos tutoriais. Mas antes os professores passam por fazer o papel dos coordenadores ou orientadores da investigação.

I - Portanto achas que o professor tem sempre essa componente de orientador e encaminhador mesmo dentro de um mundo tecnológico, faz sentido sempre haver professores?

P2 - Sim, Nós estamos a falar das tecnologias como as ferramentas que usamos para realizar as nossas propostas. E as propostas são aquilo que é debatido entre os alunos e os professores.

I - Em relação ainda ao uso das tecnologias. Acha que os professores têm de ser especialistas, um tecnólogo tendo que perceber tudo sobre uma tecnologia para a poder ensinar?

P3 - Acho que não tem de perceber tudo sobre uma tecnologia - tem de perceber bastante de algumas, ou várias; ter prática naquelas que vais explorar com os alunos, mas não tem de ser o maior especialista de uma tecnologia.

I - Achas que os alunos podem criar os seus próprios recursos de aprendizagem usando media já disponíveis? Informação disponível, filmes na internet, para explicar matérias sobre as mais diversas coisas? (Se eles próprios podem construir a sua própria aprendizagem usando esses materiais)

P4 - Sim, há alunos que têm um perfil mais vocacionado para serem autodidatas do que outros. Podem ser autodidatas do seu percurso, mas é sempre bom e mais estruturante coordenar com outros colegas e ter o acompanhamento dos professores nessa exploração, haver uma motivação, uma aplicação dessas investigações.

I - Em relação a capacidades tecnológicas, qual consideras mais importante para dar nas suas aulas? A capacidade de execução, capacidades em geral…

P5 - A capacidade de estruturação de conteúdos, de definir um projeto não-linear e definir as componentes que integram nesse projeto. No fundo, é tudo o que está integrado na metodologia projetual multimédia, ao definir um conceito conseguir perceber que existe uma estrutura não linear

por trás, conseguir desenhá-la, investigar as referências relacionadas, e colocar as tecnologias que mais se adaptem à concretização dessas referências.

I - Achas que é importante que eles tenham também alguns conhecimentos do ponto de vista da utilização da aplicação que vão utilizar?

P6 - Sim, mas isso eles têm bastante curiosidade e facilmente aprendem novas tecnologias.

I - Em relação a promover atividades que vão para além do ambiente da Universidade, achas que é importante fomentar atividades que vão para fora da Universidade?

P6 - Temos feito isso até na turma, já fizemos uma visita de estudo, no *Creative Showcase and Interactive Arts*, numa conferência que estava a haver que era o ACE (Advances in Computer and Entertainment). Essa era uma conferência fechada (apenas acessível) para as pessoas registadas, mas foi possível levar a turma a uma sessão de demonstração. Outro exemplo foi uma aula que eu não dei presencialmente, mas a distância a partir de Montemor-o-Novo, onde estávamos a preparar uma exposição de projetos relacionados com tecnologias, Algoritmos Criativos (A dois dias da inauguração da exposição dei a aula a partir de lá).

I - Mas do ponto de vista dos próprios projetos que eles desenvolvem? Sei que já fazes bastante isso de por os alunos a fazer projetos. Esses projetos têm intenções de ter alguma visibilidade para o exterior?

P7 – Sim, na terceira parte nós vamos fazer a apresentação online e a exposição dos projetos online. Não fazemos uma exposição presencial ainda porque não existe tempo físico para isso no espaço de um semestre mas havemos de divulgá-los na fase final, aqueles que concluirmos. Mas também estamos a divulgar o processo, qualquer pessoa que queira aceder ao blog tem acesso ao processo.

I - Há muito que utilizas as atividades com base em projetos (é uma disciplina de projeto), já deste várias vezes este tipo de disciplina?

P8 – Sim.

I - Associas muito a ideia de resolução de prolemas quando defines um briefing ou exercício. Não é só um projeto para desenvolver qualquer coisa independentemente de um problema associado?

P9 - Normalmente lanço um tema de base para haver uma certa sintonia e para circunscrever a relação entre os projectos.

I - Se há um problema associado?

P10 - Eu no fundo lanço desafios. Lanço um tema controverso ou que pode ter alguma controvérsia. Um dos temas que lancei foi a partir do filme “Uma Verdade Inconveniente”, então nós criámos proposta relacionadas com as alterações climáticas. Obviamente que um terço das propostas teve a ver com a parte subversiva desse projeto e era isso que também se motivava, que os alunos pesquisassem e se questionassem. As propostas são lançadas mais como desafios do que “Bom temos aqui um problema e temos que encontrar ‘a’ solução.” Tento não ter uma perspectiva mais concentrada nos problemas do que no design, mas sim em termos capacidade de olhar para os temas

e de os tratar sobre determinados pontos de vista e de criar impacto.

> **"P10 - Mainly I propose challenges. Challenges are like hot topics or topics that might be explored in a controversial way. One of the last proposed topics was set following the movie 'An Inconvenient truth'. Students created proposals related to climate change. Obviously about one third of the proposals were related to the subversive part of that project. That was to a certain extent supported as students were provoked to question themselves and to research."**

I - Portanto o facto de adotares essa postura e com esse à vontade também tem a ver com os resultados que tens tido. Portanto tens tido resultados positivos com essa postura?

P11 - Sim, estou muito satisfeita com os resultados. São pouquíssimos os alunos que não realizam a cadeira, são exceções. Tenho tido projeto que acabam por ser interessantes, sobretudo porque os percursos acabam por ser mais interessantes, porque não existe o compromisso de chegar a uma solução, existe sim fomentar a exploração de um percurso.

I - Achas que eles desenvolvem uma série de aptidões e capacidades? (por exemplo espírito crítico)

P12 - Sim, porque realmente durante o percurso há muito mais essa abertura para se experimentar do que a vontade de ter um projeto concluído e perfeito.

I - Por isso há espaço para a criatividade…

P13 - Sim, e temos momentos não só de brainstorming e os mapas conceptuais a iniciar as nossas abordagens, como também temos momentos de debate e de apresentação dos trabalhos, não só a mim mas também aos colegas e a ideia é que eles comecem a desenvolver o tal espírito crítico e a intervir mais no sentido de colaborar ou poder contribuir para dar opiniões em relação aos colegas. Até agora ainda só tivemos um primeiro mas vai haver mais duas ou três situações onde eles vão ser muito mais participativos.

Uso de tecnologias em contexto educativo (relativo a anos anteriores)

I - Em relação a anos anteriores em que já usaste tecnologias. Como é que tu costumas utilizar as tecnologias para comunicar com os alunos, em termos de utilização de ferramentas?

P14 - … dos conteúdos que eu crio ou dos projetos ou desafios que eu coloco?

I - Quando é que vês que, para interagir com os teus alunos usaste o computador ou teu telemóvel? O computador, sei que utilizas e-mails, sei que utilizas o blog, já usaste antes o blog?

P15 - Sim, é a primeira vez que estou a usar o blog. Normalmente criava o site da disciplina, criava um *template* e os alunos integravam os seus conteúdos cada um na sua área. Agora a utilização do blog permite integrar mais diálogo e comentários ou participação dos alunos nas intervenções dos colegas também. Utilizo o blog como plataforma de partilha do processo em curso. Também como comunicação dos conteúdos, para lecionar, do calendário, também para orientação de todos, minha e deles, senão estaríamos constantemente em revisão dos objetivos, das datas e em redefinições. O

blog como partilha de processos e dos vários conteúdos. O e-mail em situações de inevitabilidade: uma alteração de horário, há uma alteração em termos de espaço, que não tem uma aula pelo meio, e aí envio um e-mail para chegar a todos eles. Porque nem todos consultam o blog regularmente e nem todos sobrescreveram as novidades do blog. Então é uma forma de salvaguardar que vai para todos. Vai com os e-mails explícitos e é uma foram também de confirmar que os alunos para quem seguiu. Inicialmente eu punha BCC, por uma questão de privacidade, mas partilhar os e-mails uns com os outros é perfeitamente natural e saudável. Antes não se percebia porque [razão] um aluno ou outro não tinha recebido. (Mas tecnologias como ferramentas para concretizar os projetos?) Usar as tecnologias consoante a componente do projetos e consoante os objetivos. E a ideia de apresentar várias tecnologias para uma mesma tarefa é para nós, isto é os alunos, nos concentrarmos nas tarefas e nos conteúdos e termos mesmo a prática de que as ferramentas são formas de concretizarmos as nossas intenções. E daí apresentar normalmente mais do que uma tecnologia para o mesmo objetivo e experimentarmos várias tecnologias para um mesmo projeto.

I - Era mesmo isto que estava a querer saber. Esta ideia de eles poderem comentar os trabalhos uns dos outros se tens visto isto também a acontecer no blog.

P16 - No blog eles ainda não estão a comentar os trabalhos uns dos outros.

I - Incentivaste mas mesmo assim eles ainda estão um bocado tímidos...

P17 - Incentivei, mas eles ainda não estão a fazer. Ou seja nas primeiras apresentações eles não comentaram os trabalhos uns dos outros. Havia as apresentações de um minuto e meio e eles tinham tempo para fazer perguntas e não houve praticamente perguntas dos colegas, fui eu que fiz alguns comentários. Nesta primeira apresentação eu deixei acontecer assim porque o desafio já era eles apresentarem e exporem-se. Nesta segunda já vai haver tanto tempo de discussão como de apresentação e vão ser nomeados. Ou surgem realmente 5 minutos de discussão sem qualquer nomeação ou então os alunos são convidados a fazer esses comentários. Isso é o tal segundo momento de apresentação e no terceiro já não vai haver a tal obrigatoriedade, já os alunos vão poder livremente fazer perguntas e fazer comentários. E nessa altura já espero os resultados muito mais fluídos e naturais, já os espero mais desejosos de participar voluntariamente.

I - De qualquer maneira isso vai ser na aula não vais recorrer a nenhuma tecnologia?

P18 – Eu já tinha pensado nisso [comentários]. [Seria no sentido de] eles no blog, não só terem os *blogposts* que são propostos (que é o da sua apresentação e da apresentação de cada uma das fases dos projetos, mas também terem que fazer dois comentários à apresentações dos colegas. E eu aí sim, vou retomar essa ideia. Tínhamos falado sobre isso. Eu também fiz um workshop de empreendedorismo, e nós também tínhamos que fazer comentários. Para já eles estão numa fase seguinte em que alguns já desbloquearam e já apresentam vários artigos e vários *blogposts* do mesmo projeto, ou seja já estão um bocadinho mais expansivos. Ou então exemplos relacionados. Houve alguns exemplos dos filmes interativos, tomaram a iniciativa mas não fizeram como eu pedi.

I - Achas que é importante eles mostrarem os seus trabalhos online?

P19 - Sim. É essencial mostrarem os seus trabalhos online, a terceira e última fase do projeto é a apresentação dos projetos online. E as fases precedentes são a apresentação do processo em curso.

I - Em relação à utilização do computador nas aulas. Utilizas com regularidade o computador? Normalmente fazes alguma apresentação com base em *PowerPoint*? Ou tens alguma tecnologia de eleição que utilizes. Já vi que utilizas os *browsers* para mostrar coisas a acontecer online. Mas tens mais alguma aplicação que utilizes?

P20 - Eu utilizava mais os *PowerPoint* mas atualmente coloco as informações das várias áreas e várias secções no blog. Utilizo mais o blog como ponto de referência, como mapa conceptual geral. Noutras aulas usava o site da disciplina para relacionar com outros. Mas era mais apresentações de *PowerPoint*. Tenho imensas matérias para dar em apresentações de *PowerPoint* que [já] tenho reunidas, mas não tenho tido tempo para fazer essas apresentações completas, e então vou dando referências e colocando essas referências no blog. Com menos tempo funciona mais como orientação do que como conteúdos completos.

I - Este mapa conceptual (mapa conceptual elaborado pela professora) apresentas o mapa já feito em PDF? Ou mostras mesmo a aplicação?

P21 - Mostro exemplos de mapas conceptuais. E depois por exemplo quando mostrei o exemplo da entrevista tem sempre um mapa conceptual com um exemplo maior. Era para fazer o mapa conceptual da cadeira, mas acabei por não fazer o mapa conceptual da cadeira. E o índice do blog acaba por ser a nossa orientação. Eles é que fazem muitos mapas conceptuais, em todas as fases.

I - Em termos de regularidade, é todos os dias que utilizas o computador ligado ao projetor?

P22 - É. Utilizo o computador em todas as aulas.

I - Que outras aplicações é que costumas utilizar nas disciplinas, ou seja que aplicações já ensinaste a usar?

P23 - Nas várias disciplinas... Na introdução à computação física, utilizando o *Arduino* e o *Processing*. Também já dei em introdução ao multimédia com *Deamweaver*; mas aí tínhamos o problema de ter de comprar a aplicação e utilizar a versão demo durante um mês e depois (sujeitarmo-nos a) haver situações menos confortáveis. Então agora estou a usar aplicações *free libre open-source* (FLOSS) como as aplicações base. Desde para edição de texto o *Libre Office* (instalámos para todos os computadores) e é então a facilidade e a abertura das tais aplicações em desenvolvimento, também para eles perceberem que podem estar do lado, não só de quem utiliza mas também de quem cria. Ou seja, se há algo que não está disponível, porque não pagaram por isso, tem esta alternativa em que podem contribuir pedindo essa funcionalidade ou até investigando eles próprios como é que poderiam um dia mais tarde contribuir.

I - E utilizar algum equipamento? Se alguma vez deste indicações de utilização de equipamentos?

P24 - (Em relação a) tipo de câmaras. As minhas indicações vão mais no sentido de desbloquear e agilizar o processo, dando indicações em relação a equipamentos que já tenham. Mais do que adquirirem novos equipamentos. Mais para o início do processo. E a partir daí a partir do momento em que eles se entusiasmam, já podemos ter e dar mais especificações. Mas sim... em relação a câmaras dependendo do objetivo. Ainda hoje um aluno estava a falar *de slow motion* e dentro de água, e então estava a sugerir um modelo mais recente de uma câmara... da *GoPro*, as versões mais

recentes permitem a captura com mais *frames* por segundo. Permitem fazer *slow motions* mais suaves e mais profissionais. Sobretudo para desportos radicais.

Experiência de ensino

I - Restam duas perguntas. Quantos anos de ensino é que tu já tens.

P25 - 12.

I - Agora a pergunta a seguir é em que faixa etária é que tu te encontras?

P26 - Eu posso dizer exatamente. Eu tenho 39. Aqui comecei no dia em que fiz 30 anos. Nas belas Artes. Eu comecei a dar aulas logo quando concluí o mestrado. Comunicação educacional multimédia. Foi sempre com o objetivo de ter a prática e a teoria. Ter investigação para poder ensinar.

I - Então estiveste noutra escola antes...

P27 - Sim. Na ArCo (Centro de Arte e Comunicação) Dei *Design de Projeto*, e dei da teoria e Prática do Design. Tenho dado sempre aulas práticas ou aulas relacionadas com a concretização de projeto, mas *Teoria e Prática do Design* era uma aula teórica de 1h e meia e a primeira era de história de arte. E a primeira aula que preparei, tive imenso trabalho com conteúdos (entre outras coisas) e dei os conteúdos todos num quarto de hora.

I - Queimaste os “fusíveis” a toda a gente.

P28 - Sim, apresentei os conteúdos todos. Porque naquela aula não ia apresentar slides. Depois nas aulas seguintes já ia apresentar slides e comentar sobre os slides e fazer um panorama e dar uma ideia panorâmica sobre o que ia fala e as relações entre as várias épocas e as várias áreas. Então foi assim revelador.

I - Então tiveste estes dois anos no ArCo?

P29 – Sim.

I - Mas neste últimos 12 anos tiveste uma ou duas interrupções de 1 ano?

P30 - Tive só uma interrupção mas foi de 3 anos. Já valeu pelas sabáticas todas. Foi para deixar o papel de professora e assumir o papel de aluna outra vez. Embora tenha também participado sempre em workshops, conferências. Nos workshops faço outra vez o papel de aluno porque normalmente inscrevo-me em workshops em áreas que não domino.

I - Estes anos foram então os últimos 3 anos, é isso? Pensava que também tinhas estado sem dar aulas no início do teu Mestrado?

P31 - Não, durante o Mestrado estava a trabalhar num atelier e como freelancer. Depois no final do mestrado já não dava para estar a trabalhar no atelier mais freelancer mais mestrado. A uma certa altura comecei a trabalhar em *partime* no atelier, e na parte final saí do atelier e comecei a trabalhar só como freelancer e depois comecei a dar aulas.

I - Ok, (está feito). Obrigado.

P32 - Boa

I - Não sei se queres acrescentar mais alguma coisa por exemplo em relação ao blog?

P33 - Há uma parte das tecnologias e de eles fazerem os comentários é que desde o início que eu apresentei três ferramentas essenciais para a comunicação e a divulgação. E não está a acontecer exatamente assim. Estamos a utilizar o blog para praticamente tudo. Estou a achar preferível não dispersar. Inicialmente eu apresentei o blog como plataforma de apresentação do processo em curso, o *moodle* para colocar os elementos académicos e como plataforma de discussão, onde se discutisse só os alunos da turma e onde se colocasse as questões um bocado de acordo com esta investigação. E o *Cargo Colective* para portfólios e apresentação. Mas eles para a parte académica podem consultar a sua ficha de alunos e têm acesso aos sumários todos naquela versão mais formal. No blog eu coloquei o calendário com as aulas todas e o programa... e gostava de dinamizar mais isso dos comentários, o que ainda há-de acontecer.

Initial Questionnaire in Lisbon (2011)

Most relevant questions and answers are translated from Portuguese to English by the author and presented in ***bold italic*.**

1. Escolhe a faixa etária a que pertences:

#	Answer		Response	%
1	18 aos 20 anos		16	53%
2	21 aos 23 anos		7	23%
3	24 aos 26 anos		1	3%
4	27 aos 29 anos		2	7%
5	30 aos 32 anos		1	3%
6	mais de 33 anos		3	10%
	Total		30	100%

2. Escolhe o teu género:

#	Answer		Response	%
1	Masculino		10	33%
2	Feminino		20	67%
	Total		30	100%

3. Tens computador portátil?

#	Answer		Response	%
1	Sim		28	93%
2	Não		2	7%
	Total		30	100%

4. Tens computador pessoal de secretária onde vives?

#	Answer		Response	%
1	Sim		21	70%
2	Não		9	30%
	Total		30	100%

5. Tens câmara de filmar digital?

#	Answer		Response	%
1	Sim		15	52%
2	Não		14	48%
	Total		29	100%

6. Tens telemóvel com câmara de filmar?

#	Answer		Response	%
1	Sim		24	80%
2	Não		6	20%
	Total		30	100%

7. Tens ligação à Internet onde vives?

#	Answer		Response	%
1	Sim		30	100%
2	Não		0	0%
	Total		30	100%

8. Média diária

#	Question	Menos de 1 hora	1 - 2 horas	2 - 3 horas	3 - 4 horas	4 - 5 horas	5 - 6 horas	6+ horas	Total Resp.	Mean
1	Estudar por livros?	17	6	3	3	1	0	0	30	1.83
2	Estudar com amigos?	23	5	1	0	0	0	0	29	1.24
3	Estudar online?	10	12	3	3	1	1	0	30	2.20
4	Fazer pesquisas na internet?	0	11	9	4	4	2	0	30	3.23
5	Ver vídeos online?	10	12	3	4	1	0	0	30	2.13
6	Ver televisão?	9	8	6	5	0	1	0	29	2.38
7	Ouvir música?	1	9	3	7	3	3	4	30	3.90
8	Jogar vídeo jogos?	19	6	1	1	0	0	0	27	1.41

9. Para cada tipo de aplicação apresentada à esquerda indica quanto te consideras habilitado a usar.

#	Question	Iniciado	Inter-médio	Expe-cialista	Nunca usei	n	Mean
1	Processamento de texto (MicrosoftWord, OpenOfice)	2	15	12	0	29	18.34
2	Folha de cálculo (Excel, etc.)	11	13	1	3	28	15.89
3	Aplicações para apresentações (PowerPoint, Keynote)	2	19	8	0	29	22.21
4	Mapas de conceito (Veu, Visio, Cmaps)	15	7	1	6	29	9.10
5	Edição de imagem (Photoshop, Illustrator, iPhoto)	2	20	6	1	29	23.07
6	Edição de som (Audacity, GarageBand)	11	6	0	12	29	7.79
7	Edição de vídeo (iMovie, MovieMaker, Premiere, Final Cut)	10	14	0	5	29	16.31
8	Edição de páginas Web (Dreamweaver, iWeb, googlepages)	10	0	0	19	29	1.34

10. A tua opinião em relação ao uso de tecnologias na aprendizagem Para cada afirmação à esquerda, indica quanto concordas com ela.

#	Question	Concordo Completa-mente	Con-cordo	Não Concordo nem Discordo	Discordo	Discordo Completa-mente	n	Mean
1	Eu interesso-me mais ativamente em aulas onde se usa tecnologias digitais	11	12	7	0	0	30	4.13
2	A utilização de tecnologias nas aulas melhoram a minha aprendizagem	10	15	4	1	0	30	4.13
3	Eu desconcentro-me mais em aulas que utilizam mais tecnologias	0	2	4	15	8	29	2.00
4	Eu leio e estudo melhor online	0	5	12	11	2	30	2.67
5	Eu gosto de usar computadores nas aulas	6	13	8	3	0	30	3.73
6	Acredito na maioria das coisas que vejo na televisão	0	2	11	12	5	30	2.33
7	Acredito na maioria das coisas que leio em livros	0	13	12	5	0	30	3.27
8	Acredito na maioria	0	0	11	17	2	30	2.30

	das coisas que leio online							
9	Acredito na maioria das coisas que vejo online	0	0	14	15	1	30	2.43

11. Por favor indica quantas vezes efectuas as actividades apresentadas na coluna da esquerda?

#	Question	Nunca	Mensalmente	Semanalmente	Diariamente	Várias vezes por dia	n	Mean
1	Usar um motor de pesquisa (Google, Yahoo!)	0	0	0	4	26	30	4.87
2	Ver ou ouvir música ou vídeo online (YouTube, Vimeo)	0	1	6	13	10	30	4.07
3	Seguir podcasts ou realizar download de músicas ou vídeos	1	10	8	8	3	30	3.07
4	Usar o site da faculdade ou a página da biblioteca	0	10	16	4	0	30	2.80
5	Participar em sites de social networking (Facebook, MySpace)	3	0	1	16	10	30	4.00
6	Jogar vídeo jogos online com outros jogadores (World of Warcraft, Poker, Halo, Call of Duty, Runescape)	23	4	1	1	0	29	1.31
7	Participar em plataformas de mundos virtuais (Second Life)	29	1	0	0	0	30	1.03
8	Partilhar fotografias ou vídeos (blogs, flickr, podcasts, vodcasts) *Share photos or videos*	8	11	7	0	3	29	2.28
9	Usar internet no telemóvel	18	4	1	3	4	30	2.03
10	Ler/Enviar e-mails	0	1	6	11	11	29	4.10
11	Ler blogs, wikis ou fóruns de discussão online	1	7	12	4	6	30	3.23
12	Escrever/Comentar em blogs, wiki ou fóruns de dscussão online *Read a blog, a wiki, and/or an*	9	11	4	2	4	30	2.37

	online discussion forum							
13	Participar em chats de mensagens de texto (iChat, aim, GoogleTalk, facebook chat)	6	3	11	9	1	30	2.87
14	Enviar mensagens SMS por telemóvel *Text messaging on phone*	0	1	4	5	20	30	4.47
15	Participar em conversas (audio/vídeo) online (iChat, Skype)	8	10	8	4	0	30	2.27
16	Usar o Twitter	23	2	2	2	0	29	1.41

#	Question	Nunca	Mensalmente	Semanalmente	Diariamente	Várias vezes por dia	n	Mean
1	Usar um motor de pesquisa (Google, Yahoo!)	0	0	0	4	26	30	4.87
2	Ver ou ouvir música ou vídeo online (YouTube, Vimeo)	0	1	6	13	10	30	4.07
3	Seguir podcasts ou realizar download de músicas ou vídeos	1	10	8	8	3	30	3.07
4	Usar o site da faculdade ou a página da biblioteca	0	10	16	4	0	30	2.80
5	Participar em sites de social networking (Facebook, MySpace)	3	0	1	16	10	30	4.00
6	Jogar vídeo jogos online com outros jogadores (World of Warcraft, Poker, Halo, Call of Duty, Runescape)	23	4	1	1	0	29	1.31
7	Participar em plataformas de mundos virtuais (Second Life)	29	1	0	0	0	30	1.03
8	Partilhar fotografias ou vídeos (blogs, flickr, podcasts, vodcasts)	8	11	7	0	3	29	2.28
9	Usar internet no telemóvel	18	4	1	3	4	30	2.03
10	Ler/Enviar e-mails	0	1	6	11	11	29	4.10
11	Ler blogs, wikis ou fóruns	1	7	12	4	6	30	3.23

	de discussão online							
12	Escrever/Comentar em blogs, wiki ou fóruns de dscussão online	9	11	4	2	4	30	2.37
13	Participar em chats de mensagens de texto (iChat, aim, GoogleTalk, facebook chat)	6	3	11	9	1	30	2.87
14	Enviar mensagens SMS por telemóvel	0	1	4	5	20	30	4.47
15	Participar em conversas (audio/vídeo) online (iChat, Skype)	8	10	8	4	0	30	2.27
16	Usar o Twitter	23	2	2	2	0	29	1.41

Initial Questionnaire in Lisbon (2012)

1. Escolhe a faixa etária a que pertences:

#	Answer		Response	%
1	18 aos 20 anos		3	30%
2	21 aos 23 anos		5	50%
3	24 aos 26 anos		1	10%
4	27 aos 29 anos		0	0%
5	30 aos 32 anos		1	10%
6	mais de 33 anos		0	0%
	Total		10	100%

2. Escolhe o teu género:

#	Answer		Response	%
1	Masculino		6	60%
2	Feminino		4	40%
	Total		10	100%

3. Tens computador portátil?

#	Answer		Response	%
1	Sim		8	80%
2	Não		2	20%
	Total		10	100%

4. Tens computador pessoal de secretária onde vives?

#	Answer		Response	%
1	Sim		4	40%
2	Não		6	60%
	Total		10	100%

5. Tens telemóvel com câmara de filmar?

#	Answer		Response	%
1	Sim		9	90%
2	Não		1	10%
	Total		10	100%

6. Tens câmara de filmar digital?

#	Answer		Response	%
1	Sim		4	40%
2	Não		6	60%
	Total		10	100%

7. Tens ligação à Internet onde vives?

#	Answer		Response	%
1	Sim		10	100%
2	Não		0	0%
	Total		10	100%

8. Média diária

#	Question	Menos de 1 h	1 - 2 h	2 - 3 h	3 - 4 h	4 - 5 h	5 - 6 h	Mais de 6 h	n	Mean
1	Estudar por livros?	5	4	0	1	0	0	0	10	1.70
2	Estudar com amigos?	8	1	0	0	1	0	0	10	1.50
3	Estudar online?	4	2	0	3	1	0	0	10	2.50
4	Fazer pesquisas na internet?	0	4	1	2	2	0	1	10	3.60
5	Ver vídeos online?	3	6	1	0	0	0	0	10	1.80
6	Ver televisão?	4	2	4	0	0	0	0	10	2.00
7	Ouvir música?	1	2	1	0	3	0	2	9	4.11
8	Jogar vídeo jogos?	8	2	0	0	0	0	0	10	1.20

9. Para cada tipo de aplicação apresentada à esquerda indica quanto te consideras habilitado a usar.

#	Question	Iniciado	Intermédio	Expecialista	Nunca usei	n	Mean
1	Processamento de texto (MicrosoftWord, OpenOfice)	1	5	4	0	10	17.80
2	Folha de cálculo (Excel, etc.)	3	4	1	2	10	14.00
3	Aplicações para apresentações (PowerPoint, Keynote)	2	3	4	1	10	11.70
4	Mapas de conceito (Veu, Visio, Cmaps)	4	4	0	2	10	13.80
5	Edição de imagem (Photoshop, Illustrator, iPhoto)	0	6	4	0	10	20.80
6	Edição de som (Audacity, GarageBand)	5	2	0	3	10	7.70
7	Edição de vídeo (iMovie, MovieMaker, Premiere, Final Cut)	4	5	1	0	10	17.20
8	Edição de páginas Web (Dreamweaver, iWeb, googlepages)	3	4	1	2	10	14.00

10. Frequência

#	Question	Nunca	Mensalmente	Semanalmente	Diariamente	Várias vezes por dia	n	Mean
1	Usar um motor de pesquisa (Google, Yahoo!)	0	0	0	2	8	10	4.80
2	Ver ou ouvir música ou vídeo online (YouTube, Vimeo)	0	0	2	3	5	10	4.30
3	Seguir podcasts ou realizar download de músicas ou vídeos	0	3	5	0	2	10	3.10
4	Usar o site da faculdade ou a página da biblioteca	0	4	6	0	0	10	2.60
5	Participar em sites de soci networking (Facebook, MySpace)	0	0	0	5	5	10	4.50
6	Jogar vídeo jogos online com outros jogadores (World of Warcraft, Poker, Halo, Call of Duty, Runescape)	7	2	0	1	0	10	1.50
7	Participar em plataformas de mundos	10	0	0	0	0	10	1.00

	virtuais (Second Life)							
8	Partilhar fotografias ou vídeos (blogs, flickr, podcasts, vodcasts)	1	3	3	3	0	10	2.80
9	Usar internet no telemóvel	3	1	3	3	0	10	2.60
10	Ler/Enviar e-mails	0	0	1	7	2	10	4.10
11	Ler blogs, wikis ou fóruns de discussão online	2	1	4	2	1	10	2.90
12	Escrever/Comentar em blogs, wiki ou fóruns de dscussão online	2	3	3	0	1	9	2.44
13	Participar em chats de mensagens de texto (iChat, aim, GoogleTalk, facebook chat)	0	0	4	2	4	10	4.00
14	Enviar mensagens SMS por telemóvel	0	1	0	2	7	10	4.50
15	Participar em conversas (audio/vídeo) online (iChat, Skype)	1	1	3	4	1	10	3.30
16	Usar o Twitter	4	4	2	0	0	10	1.80

11. A tua opinião em relação ao uso de tecnologias na aprendizagem. Para cada afirmação à esquerda, indica quanto concordas com ela.

#	Question	Concordo Completamente	Con-cordo	Não Concordo nem Discordo	Dis-cordo	Discordo Completamente	n	Mean
1	Eu interesso-me mais activamente em aulas onde se usa tecnologias digitais	5	3	1	1	0	10	4.20
2	A utilização de tecnologias nas aulas melhoram a minha aprendizagem	1	7	1	1	0	10	3.80
3	Eu desconcentro-me mais em aulas que utilizam mais tecnologias	0	0	5	4	1	10	2.40

4	Eu leio e estudo melhor online	1	2	3	3	1	10	2.90
5	Eu gosto de usar computadores nas aulas	3	6	0	1	0	10	4.10
6	Acredito na maioria das coisas que vejo na televisão	0	0	4	3	3	10	2.10
7	Acredito na maioria das coisas que leio em livros	0	5	3	1	1	10	3.20
8	Acredito na maioria das coisas que leio online	0	0	4	4	2	10	2.20
9	Acredito na maioria das coisas que vejo online	0	0	4	5	1	10	2.30

Final Questionnaire in Lisbon (2011)

Most relevant questions and answers are translated from Portuguese to English by the author and presented in ***bold italic*.**

1. Média diária

#	Question	Menos de 1 h	1 - 2 h	2 - 3 h	3 - 4 h	4 - 5 h	5 - 6 h	Mais de 6 h	n	Mean
1	Estudar por livros?	11	7	4	0	0	0	0	22	1.68
2	Estudar com amigos?	15	5	2	0	0	0	0	22	1.41
3	Estudar online? *Studying online?*	8	8	6	0	0	0	0	22	1.91
4	Fazer pesquisas na internet?	0	11	6	4	1	0	0	22	2.77
5	Ver vídeos online?	10	6	2	2	2	0	0	22	2.09
6	Ver televisão?	10	6	3	1	1	1	0	22	2.09
7	Ouvir música?	2	4	4	3	3	2	4	22	4.05
8	Jogar vídeo jogos?	18	2	1	0	0	0	0	21	1.19

Statistic	Estudar por livros?	Estudar com amigos?	Estudar online?	Fazer pesquisas na internet?	Ver vídeos online?	Ver televisão?	Ouvir música?	Jogar vídeo jogos?
Min Value	1	1	1	2	1	1	1	1
Max Value	3	3	3	5	5	6	7	3
Mean	1.68	1.41	1.91	2.77	2.09	2.09	4.05	1.19
Variance	0.61	0.44	0.66	0.85	1.80	1.99	4.05	0.26
Standard Deviation	0.78	0.67	0.81	0.92	1.34	1.41	2.01	0.51
Total Responses	22	22	22	22	22	22	22	21

2.

#	Question	Nunca	Mensalmente	Semanalmente	Diariamente	Várias vezes por dia	n	Mean
1	Usar um motor de pesquisa (Google, Yahoo!).	0	0	0	5	17	22	4.77
2	Ver ou ouvir música ou vídeo online (YouTube, Vimeo).	0	1	3	11	7	22	4.09
3	Seguir podcasts ou realizar download de músicas ou vídeos.	2	7	6	5	2	22	2.91
4	Usar o site da faculdade ou a página da biblioteca.	3	7	10	1	0	21	2.43
5	Participar em sites de redes sociais (Facebook, MySpace).	3	0	2	8	9	22	3.91
6	Jogar vídeo jogos online com outros jogadores (World of Warcraft, Poker, Halo, Call of Duty, Runescape).	19	2	0	1	0	22	1.23
7	Participar em plataformas de mundos virtuais (Second Life).	22	0	0	0	0	22	1.00
8	Partilhar fotografias ou vídeos (blogs, flickr, podcasts, vodcasts).	5	10	5	1	1	22	2.23
9	Usar internet no telemóvel.	15	1	3	2	1	22	1.77
10	Ler/Enviar e-mails.	0	0	5	10	7	22	4.09
11	Ler blogs, wikis ou fóruns de discussão online.	3	3	7	5	3	21	3.10
12	Escrever/Comentar em blogs, wiki ou fóruns de discussão online.	14	5	0	1	2	22	1.73
13	Participar em chats de mensagens de texto (iChat, aim, GoogleTalk, facebook chat).	4	4	4	7	3	22	3.05
14	Enviar mensagens SMS por telemóvel.	0	0	3	3	16	22	4.59
15	Participar em conversas (áudio/vídeo) online (iChat, Skype).	5	6	8	2	1	22	2.45
16	Usar o Twitter.	18	3	1	0	0	22	1.23

3. Relativamente às actividades associadas ao uso do Korsakow. Para cada afirmação à esquerda, por favor indica o teu nível de concordância.

#	Question	Con-cordo total-mente	Con-cordo	Não concordo nem discordo	Dis-cordo	Dis-cordo total-mente	n	Mean
1	Na generalidade eu gostei da actividade em que desenvolvemos vídeos interactivos.	2	16	4	0	0	22	2.09
2	O suporte técnico foi ajustado às minhas necessidades.	1	14	7	0	0	22	2.27
3	Fiquei satisfeito com o filme que desenvolvemos.	2	14	5	1	0	22	2.23
4	As actividades aumentaram a minha motivação para estudar on-line.	1	3	14	4	0	22	2.95
5	As tarefas eram desafiadoras.	2	10	9	1	0	22	2.41
6	As actividades eram muito exigentes.	0	2	9	11	0	22	3.41
7	Considero a acividade uma perda de tempo.	0	1	4	12	5	22	3.95
8	Gostei da maioria dos projetos dos meus colegas.	0	16	5	1	0	22	2.32
9	Percebi a lógica de atribuição de palavras-chave dos trabalhos dos meus colegas.	2	14	6	0	0	22	2.18
10	Acredito ter aprendido alguma coisa a partir do trabalho dos meus colegas. ***I believe I learned something with other students' work.***	3	13	6	0	0	22	2.14

4. Em relação à tua experiência de utilização da internet e redes sociais, por favor indica o teu nível de concordância.

#	Question	Concordo totalmente	Concordo	Não concordo nem discordo	Discordo	Discordo totalmente	n	Mean
1	Foi difícil para mim encontrar recursos vídeo e imagens online.	0	2	2	14	4	22	3.91
2	A internet foi útil para trocar informação com outros colegas.	8	12	1	1	0	22	1.77
3	Consegui encontrar formas de verificar a qualidade e validade dos recursos (vídeo e imagem) que escolhi para o meu projeto. *I could find ways to check the quality and accuracy of the media I chose for my project.*	3	13	6	0	0	22	2.14
4	O professor ajudou a desenvolver o meu projeto.	3	13	6	0	0	22	2.14
5	A comunicação com o professor foi apropriada.	4	10	7	1	0	22	2.23
6	Foi fácil partilhar informação e recursos (vídeo e imagem).	5	13	3	1	0	22	2.00
7	O trabalho de equipa foi bom.	10	11	1	0	0	22	1.59
8	Utilizei fóruns online para trocar informação fora das aulas.	1	5	5	5	6	22	3.45
9	Sinto-me mais informado sobre potenciais riscos associados à utilização da internet.	0	7	11	3	1	22	2.91

5. Em relação à tua experiência na edição e gestão de recursos multimédia, por favor indica o teu nível de concordância.

#	Question	Con-cordo total-mente	Con-cordo	Não concordo nem discordo	Dis-cordo	Dis-cordo total-mente	n	Mean
1	Não tive problema em editar os recursos que queria utilizar.	3	13	5	1	0	22	2.18
2	Tive dificuldade em desenvolver redes ou estratégias de atribuição de palavras-chave para o meu projeto.	0	3	8	10	1	22	3.41
3	Aprendi bastante vendo vídeos online. ***I learned a lot watching lots of videos online.***	2	12	8	0	0	22	2.27
4	Facilmente desenvolvi mapas de conceitos sobre os temas que quis abordar.	4	12	6	0	0	22	2.09
5	Foi difícil escolher as palavras-chave para classificar os recursos que queria utilizar.	0	1	8	11	2	22	3.64

Statistic	Não tive problema em editar os recursos que queria utilizar	Tive dificuldade em desenvolver redes ou estratégias de atribuição de palavras-chave para o meu projeto.	Aprendi bastante vendo vídeos online. ***I learned a lot watching lots of videos online.***	Facilmente desenvolvi mapas de conceitos sobre os temas que quis abordar	Foi difícil escolher as palavras-chave para classificar os recursos que queria utilizar.
Min Value	1	2	1	1	2
Max Value	4	5	3	3	5
Mean	2.18	3.41	2.27	2.09	3.64
Variance	0.54	0.63	0.40	0.47	0.53
Standard Deviation	0.73	0.80	0.63	0.68	0.73
Total Responses	22	22	22	22	22

6. Em relação à tua experiência na utilização da aplicação Korsakow, por favor indica o teu nível de concordância.

#	Question	Concordo totalmente	Concordo	Não concordo nem discordo	Discordo	Discordo totalmente	n	Mean
1	Adaptei-me facilmente à interface do Korsakow. *I easily adapted to Korsakow's interface.*	3	11	3	5	0	22	2.45
2	Considero que aprendi muito pouco nesta atividade. *I consider that I have learned very little in this activity*	0	5	8	7	2	22	3.27
3	Considero ser capaz de criar sozinho vídeos interativos. *I feel that I am now able to build interactive movies by myself*	4	15	2	1	0	22	2.00
4	Não tive problema em editar e gerir os diferentes recursos que queria usar.	0	13	8	1	0	22	2.45
5	Não tive problemas em editar a interface de apresentação do meu vídeo interativo.	2	8	7	5	0	22	2.68
6	Espero usar o Korsakow noutros projetos de outras disciplinas.	3	8	9	1	1	22	2.50
7	Espero usar o Korsakow em projetos fora do âmbito da faculdade.	3	7	10	1	1	22	2.55

Statistic	Adaptei-me facilmente à interface do Korsakow *I easily adapted to Korsakow' s interface.*	Considero que aprendi muito pouco nesta atividade. *I consider that I have learned very little in this activity*	Considero ser capaz de criar sozinho vídeos interativos *I feel that I am now able to build interactive movies by myself*	Não tive problema em editar e gerir os diferentes recursos que queria usar	Não tive problemas em editar a interface de apresenta-ção do meu vídeo interativo	Espero usar o Korsakow noutros projetos de outras disciplinas	Espero usar o Korsakow em projetos fora do âmbito da faculdade
Min Value	1	2	1	2	1	1	1
Max Value	4	5	4	4	4	5	5
Mean	2.45	3.27	2.00	2.45	2.68	2.50	2.55
Variance	1.02	0.87	0.48	0.35	0.89	0.93	0.93
Standard Deviation	1.01	0.94	0.69	0.60	0.95	0.96	0.96
n	22	22	22	22	22	22	22

7. O que consideras que correu bem nesta atividade?

Text Response
A adaptação de um projeto de tema livre a um objectivo multimédia -imaginação sem perder objectividade.
Aprendi a usar o korsakow, desenvolvi o meu pensamento não linear, e estou a par de alguns locais da internet com utilidades interessantes para o processo criativo *"I have learned to use Korsakow, developed non-linear thinking, and I am aware of some sites with interesting utilities for the creative process"*
A aprendizagem foi adequada ao nível de conhecimento que tinha até ao momento.
Interactividade e correlação do grupo, a nível de divisão de tarefas e de nos ensinarmos e aprendermos uns com os outros. *The group interactivity and relationships at the level of task distribution, teaching and learning with each other.*
Ter conhecimento do programa.
aprendizagem de ferramentas de edição video e nova forma de divulgar video na internet
O trabalho de grupo foi fundamental. *Group work was fundamental.*
o resultado do projecto
Os conhecimentos aquiridos e a sua aplicação. *"The acquired knowledge and its application."*
A aprendizagem do programa foi muito fácil e os exemplos que mostraram no início da actividade esclareceram todas as dúvidas que tinha a certa do programa.
A qualidade dos filmes inseridos pelo meu grupo no korsakow
Trabalho em equipa *Team work*
A aprendizagem do modo de funcionamento de um interface interactivo.

Statistic	Value
Total Responses	13

8. O que consideras que não correu bem nesta actividade?

Text Response
É um defeito e uma oportunidade de melhoria: o korsakow podia funcionar melhor, na medida em que não se precisaria de fazer tentativa-erro para colocar os títulos no sítio certo. Era fabuloso se o korsakow funcionasse para videos lifestream. Fazia-se o aspecto da template e o usufruidor escolheria qual dos videos decorrentes poderia escolher.
Creio que houve pouca prática nas aulas, gostava de ter aprendido algumas bases de outros softwares , mesmo que tivesse de ser eu a ver na web a maior parte dos tutoriais.
A distribuição de tarefas pelo grupo foi mal gerida. *The group tasks distribution was ill managed*
Deparei-me com vários conflitos no que diz respeito a compor o vídeo interactivo no Korsakow.
Falta de apoio em alternativas de construção da interface. Falta de apoio em pequenos pormenores de montagem do projeto. Falta de apoio total na edição, imagem, som, montagem dos videos e transformação de imagens para colocação no projeto.
o objectivo da plataforma aplicada não está bem definido quanto ao seu potencial perante as expectativas do curso especifico
Gostaria de ter tido mais aulas para esta actividade. O tempo foi suficiente para aprender a mexer com o programa mas acho que com mais tempo poderia ter obtido resultados muito melhores.
A qualidade da imagem que o korsakow retira aos filmes importados. O korsakow ser compatível com muito poucos formatos
Nada a comentar
Nem todos os elementos do grupo contribuiram para a dinâmica de trabalho. *Not all elements of the group contributed for the work dynamic.*

Statistic	Value
Total Responses	10

9. Que sugestões propões para melhorar esta actividade?

Text Response
Para o programa em si já referi.
Acho que seria melhor alargar o tempo que se usa na aula para realizar trabalhos práticos e ensinar algumas bases de software mesmo que a maior parte das vezes tenham que ser os alunos a pesquisar turoriais na net. creio ser mais proveitoso para os alunos passarem mais tempo a realizar vários trabalhos curtos (cada trabalho conforme o interesse dos alunos, tendo que adquirir habilidades técnicas para cada trabalho) e não tanto tempo a planear os trabalhos e a apresentar os planos. *I believe there should be more time for developing hands-on work in class, an teach the software basis, even if most of the times students have to search for tutorials online.*
Um melhor aproveitamento do tempo de aulas para expor melhor os conteúdos do programa korsakow
Mais apoio na edição, captação, som, imagem, do material para ser colocado na interface. Especial atenção aos alunos que não são da área de multimédia e não têm conhecimento das linguagens próprias da área, nem das bases para edição e produção de imagem e vídeo, e ainda, som. Maior rigor e organização na exposição das aulas, bem como maior interactividade para chamar o entusiasmo dos alunos. *More support in editing, recording, sound, image for the materials used in the interface. With special attention to students that are not from multimedia and are not aware of the field vocabulary, nor have basic skills in editing or production of image, video or sound.*
no caso da licenciatura de ciencias da arte os potenciais desta aplicação deveriam ser mais bem definidos e sugestivos. Se para as licenciaturas de criatividade e produtividade a ferramenta é aliciante para projectos multimédia, no caso do CAP, deveria haver uma abordagem mais flexivel e direccionada para a divulgação de conteudos, correndo o risco de os alunos não entenderem a utilidade da aplicação.
Explorar uma maior aplicação do programa korsakow no âmbito profissional.
A divulgação dos objectivos a concretizar neste semestre, consequentemente no projecto, tem que ser mais explícita.
Uma melhor explicação da forma como se programam os SNU's.
Se houver hipótese de começar mais cedo a actividade acho que serão obtidos resultados mais interessantes por parte dos alunos
A unica coisa que poderia mudar seria, a qualidade do programa a utilizar para criar o video interactivo. Isto porque, tirou bastante qualidade dos videos do meu grupo, entre outros problemas que tivemos com o programa em si.
Nada a comentar

Statistic	Value
Total Responses	11

Professor Final Interview of 2011 *(transcript)*

Lisbon, January 17th, 2012

The interview was made in Portuguese some framing questions and answers were translated to English by the author along the text and are presented in **bold** (**P10, 14, 17, 18, 30, 32, 33, 34 and 40**).

Atitudes e competências dos alunos

Investigador - Sentiste uma mudança nos comportamentos dos alunos em relação ao uso da internet e das tecnologia em geral. Não sei se consegues separar entre aquilo que foi até começarmos a falar do *Korsakow* e antes.

Professora 1 - Uma coisa que estava antes e que continuou ao longo deste trabalho, foi a publicação online através do blog. O blog funcionou como se fosse aquela plataforma, ou um fórum de discussão no *moodle*. Não houve tanta discussão mas houve a apresentação de todos os elementos e acabou por haver a exposição de material. Embora não houvesse tanto diálogo.

I - Por exemplo, esta questão da exposição no blog, achaste que foi importante para se sentirem mais à vontade com a publicação, e que isso é positivo e é bom para eles.

P2 - Sim, foi a nossa intenção. Propusemos a utilização destas plataformas, (para que eles possam) estar à vontade a comentar nas redes sociais, mas a publicar conteúdos deles e a comentar dentro das suas áreas de estudo.

I - Ao início referiste que eles não estavam a colocar categorias nos *blog-posts* deles, isso melhorou ao longo do tempo.

P3 - Sim. Neste momento no blog já só temos menções sem categoria daqueles alunos que não vieram às sessões.

I - Eles então corrigiram para trás?

P4 - Sim, por recomendação, quer seja pela indicação na aula que ainda podiam melhorar quer seja nos comentários individuais. E aperceberam-se. Nos trabalhos de grupo já não foi necessário. Havia sempre um elemento do grupo que já tinha participado e que já estava consciente disso.

I - Uma das coisas que eu pelo menos vi, mas não sei se tiveste também essa noção, de eles terem procurado bastante informação online. Sentiste isso, que eles andaram a ver vídeos a ver material.

P5 - Sim, quer seja na fase inicial em que podiam fazer pesquisa sobre as ideias que pudessem vir a propor - e aí também eles tinham que encontrar referências e selecionar as referências que iam apresentar - mas também nesta fase de produção de conteúdos em que eles procuraram vídeos relacionados com o tema que estava a resolver e mesmo alguns procuraram e vieram a utilizar vídeos que encontraram online e que servem de referência e enquadraram devidamente, mesmo não

sendo da sua autoria.

I - Achas que eles estiveram motivados a utilizar a aplicação *Korsakow* em específico?

P6 - Sim, até havia alguns que se inscreveram na optativa porque sabiam que ia ser uma disciplina em que iam trabalhar com vídeo interativo.

I - Portanto o chavão para eles foi ser vídeo interativo?

P7 - Não, eles já falavam da aplicação Korsakow. Alguns já sabiam, outros não.

I - Lembro-me que não era obrigatório eles utilizarem o *Korsakow*, mas a maioria acabou de uma forma ou de outra por utilizar no projeto final o *Korsakow*?

P8 - Sim, todos os grupos utilizaram. Era uma das componentes do projeto, ou seja deveriam experimentar todos. Todas as características das propostas dos projetos, eles poderiam fazer uma proposta alternativa, mas não fazendo proposta alternativa essa era uma das componentes que deveria estar integrada, não era obrigatório que o projeto feito em Korsakow fosse o produto final da ideia deles mas que tivesse de ser uma das componentes. Por exemplo alunos que propõem uma instalação interativa, utilizaram o Korsakow como ferramenta para a documentação do processo. Uma espécie de "making off". Outros [ainda] para prototipagem de uma instalação que ainda não está pronta, mas que estão lá os elementos.

I - E um dos projetos também é a prototipagem de um jogo.

P9 - Sim.

I - E achas que houve uma melhoria nas atitudes e competências que eles demonstraram em termos de utilização das tecnologias? (Se houve uma evolução nestes dois meses de utilização do computador)

P10 - Sim. Havia alunos de *Ciências da Arte e Património* (CAP) que começaram por salvaguardar que nunca tinham trabalhado com vídeo. Estavam muito receosos com esse meio, mas muito facilmente utilizaram. Criaram e utilizaram vídeos, por exemplo. Sim.

> **I - And do you think there was an improvement in the attitudes and skills they have demonstrated in the use of technology. (Was there an evolution in computer use in these two months)**
>
> **P10 - Yes. There were CAP students that began by clarifying that they never worked with video. They were afraid of this medium, but were able to easily use it. For example. They did use videos and created videos by themselves. Yes.**

Resultados dos alunos

I - Achas que (por exemplo do ponto de vista de pensamento crítico) eles também exploraram essa componente de abordar os temas de uma forma diferente por estarem a utilizar a internet e por estarem expostos a muita informação? Ou achas que foram um bocado acríticos na utilização do material?

P11 - Acho que eles inicialmente estava um bocadinho acríticos quando lhe foi proposto o projeto e concretização com a ferramenta. Preocupados com a dimensão técnica, mas quando começaram a trabalhar com a ferramenta aí é que começaram a ser mais críticos e a criar com intenção, e aí foram ver mais exemplos e repensaram os projetos. Porque inicialmente testaram a ferramenta e depois tiveram necessidade de que a fundamentação da sua utilização da ferramenta fosse mais relacionada com o tema.

I - Ok. Achas que houve algum projeto que desse para perceber que eles estavam a querer contar uma história? Algum projeto que tivesse essa componente mais narrativa.

P12 – Mais narrativa… Os alunos que fizeram um "making-of", acabaram por contar a história do conceito e da forma como tiveram a ideia através do Korsakow. A maioria são fragmentos. Muitos são documentais. Alguns propunham mais experiências… O diálogo do 2050, com perguntas e respostas, mas aí a ordem pode variar. Mas continua a ser os tais fragmentos. Pois, acho nesse projeto eles tiveram de facto um bocado essa dificuldade de conseguir transformar aquilo numa história. Ao chegar ao fim podes voltar a repetir. Parece que não houve tempo para eles contarem uma história com princípio meio e fim. (Isto talvez devido à) urgência da criação dos projetos na fase final. (Não conseguiram) pensar os projetos no sentido de os tornar mais apelativos e mais apreensíveis através do "storytelling".

I - Em relação à colaboração entre alunos, achaste que houve um bom ambiente de colaboração de grupos?

P14 - Eu acho que foi muito eficaz. Em muitos casos houve bom ambiente e complementaridade e noutros casos em que terá havido assim mais conflito, houve muita negociação e funciona como uma ótima experiência para futuras abordagens que eles tenham**. Acho que foi um caso de sucesso em termos de colaboração.** Houve um quarto dos grupos que teve algumas dessintonias mas nenhum dos grupos desistiu de ser grupo. Independentemente de inicialmente haver algumas ameaças disso.

> **I - In what concerns collaboration between students, was there a good collaboration environment?**
>
> **P14 - Yes I believe it was much effective. In many cases the was a good environment and complementarity, in others where some conflict may existed, there was much negotiation and it was a good experience for future approaches they will have. I believe that in what concerns collaboration it was a success." …**

I – Ok. Isto portanto foram eles próprios que escolheram a forma como se iam juntar em grupo? (Pelo menos a maioria)

P15 - Sim. Dois ou três, ou três ou quatro no final, (os) que não tinham vindo às sessões anteriores e não tinham tido grupo. Em vez de estarem a criar um grupo novo ou de estarem a trabalhar sozinhos, juntaram-se a grupos existentes. Portanto não foi a primeira opção, mas também não tinham alternativa.

I - E em relação às tuas interações com os grupos. O que é que achaste? Foram boas? Eles tiveram

dificuldade em falar contigo?

P16 - Foram boas. Eu senti alguma falta de tempo, mas eles também não me exigiam mais do que isso, e essa falta de tempo foi compensada pelos prolongamentos de umas últimas aulas, com tranquilidade sim.

Utilização do Korsakow

I - Em relação ao empenho que os alunos mostraram. Achas que eles tiveram mais empenho ou menos empenho por estarem a usar o Korsakow?

P17 - Acho que eles se sentiram muito motivados a partir do momento em que começaram a usar a ferramenta, e a verificar que funcionava e que resultava. O empenho inicial não era tanto quanto era desejado ou esperado. Tanto que queríamos coisas a funcionar antes, em Dezembro. Portanto demorou um pouquinho a começar.

I - Mas esse empenho veio mais da necessidade de finalizar o projeto do que propriamente devido às características da aplicação?

P18 – Sim. Eles gostaram dos exemplos e das demonstrações e da aplicação em si. Mas estavam com falta de coragem e de coordenação nos grupos. E acabaram para deixar para depois.

> **I - In what concerns students' commitment. You think their commitment was higher because they were using Korsakow?**
>
> **P17 - I believe they felt very motivated since the moment in which they started using the tool, and they verified that it worked. The initial commitment was not as much as desired or expected. We wanted things working before December. So it took a bit while longer to start.**
>
> **I - But that commitment came from the need of coming to an end with the project rather than the characteristics of the application?**
>
> **P18 - Yes. They liked the examples, the demonstrations and the application in itself. But they lacked the courage and group management. And postponed (much of the work).**

I - Em relação mesmo aos resultados dos alunos? Achas que os projetos tiveram na generalidade qualidade final?

P 19 – Isso. De fato chegámos àquele ponto em que eles se empenharam, no final empenharam-se bastante. Tanto que há alguns que estão a propor ainda depois da avaliação, desenvolver mais ainda e vir a atualizar e isso é bom sinal. Mas os trabalhos ficaram bastante bons para o tempo em que foram concretizados, mas cada grupo e cada um dos alunos há de ter aquela sensação de que poderia ser um pouco melhor se já tivesse chegado a este ponto numa fase anterior. Estão satisfatórios, estão bons (Alguns). A maioria realmente tinha grandes hipóteses de ser otimizado.

I - Interessa-me a tua opinião. De facto a própria pessoa tem sempre a noção de que pode fazer sempre um bocadinho melhor, mas pronto era mais o que é que tu achavas em relação a outros

projetos que já fizeste com outros alunos. Achas que (seria diferente caso) se tivesse usado outra aplicação que não fosse se calhar tão complicada? O que é que achas que condicionou esse atraso?

P20 - Acho que foi mesmo tempo para coordenação e produção dos conteúdos. A utilização da aplicação acho que eles até devem ter ficado surpreendidos. Acabou por ser muito mais rápida do que eles estariam a pensar. Todos os conflitos todas as situações, todos os problemas que apareceram, ficaram resolvidos, as questões que eles foram colocando. Alguns com alternativas, que tu foste sugerindo também.

I - Uma pergunta sobre a utilização de conceitos. Achas que o facto de utilizar este mapas conceptuais e a ideia de criar estes links ou estas redes semânticas, facilitou eles perceberem melhor ou terem um entendimento um bocadinho mais alargado dos temas ou conceitos?

P21 – Sim. A não-linearidade, a hipertextualidade... Um dos registos que eu acho interessante confrontar é os mapas conceptuais iniciais, com as suas expectativas, e os mapas feitos nos *focus group* com os que fizeram na aplicação que criaram no Korsakow. E esses mapas eles já fizeram, a maioria, já desenhou depois de já ter feito a aplicação. Uma das componentes que era exigida nas imagens. E aí eles já estão muito mais à vontade e percebe-se muito melhor essas ligações. Aqueles que fizeram estruturas hierárquicas em pirâmide percebem que, ou chegaram à conclusão, ainda ontem na avaliação, que poderiam ter feito muito mais ligações nos elementos na base e definir ali uma diversidade de percursos [cruzando as mãos] com alguma variedade e que podiam ter trocado mais… interligado por exemplo.

I - Portanto alguns só mais mesmo no fim é que começaram a ter essa noção?

P22 - Sim. Sim. Vamos ver ainda mais alguns mapas conceptuais daquilo que foi feito.

I - Achas que as soluções a que eles chegaram foram criativas? Não só para eles (para eles deve ter sido porque é uma aplicação completamente nova).

P23 – Sim. Acho que foi muito baseada nas pesquisas que fizeram. Também propor-se um tema comum como a água… muito baseadas naquela pesquisa inicial. Sim foram mais exploratórias. Não foi assim procurar ser completamente original em todas as ideias que se pudesse ter.

I - Achaste que houve coisas originais? Ou achas que foram coisas aproveitadas.

P24 – Sim. Nenhumas das ideias foram uma transposição de algo que tivessem visto (exatamente). Sim, foram originais nas suas abordagens.

I - Houve algum trabalho, que tu digas que mostrasse pensamento crítico em relação ao tema escolhido? (O tema da água presta-se a muitas formas de abordagem, umas mais lúdicas outras mais contestatárias, [referindo] a influência do comportamento humano)

P25 – Pensamento crítico em relação à natureza e ao ambiente – sim, existe bastante. E em relação ao tema - sim, em praticamente todos, em muitos. Em relação ao pensamento crítico em relação à forma como se conjuga o tema com a forma como se apresenta, sim também, mas mais com o objetivo de demonstração, de ilustrar um conceito, do que de criticar ou comentar a forma como as coisas são.

I - Portanto em relação a algumas críticas que eram feitas em relação ao comportamento humano, há algum trabalho que tu te lembres que tenha essa componente bem expressa? (Que tenha mostrado que fez uma reflexão sobre problemas que existem em relação à água?)

P26 - Sim, a tal "Conversa de 2050", por exemplo. Havia um em relação ao lixo, o "H_2O", com lixo da praia, e o tal jogo interativo, com a questão da dessalinização da água, por exemplo.

I - Em relação a estratégias de estudo, achas que por estarem em grupo, promoveram-se boas atividades para estudarem os temas? (Se houve novas formas, por estarem online, a publicar a procurar online?)

P27 – Sim, eles sentiram mais necessidade de coordenação. Não usaram o blog como forma de troca de ideias ou de comunicação entre os elementos do grupo, mas [antes] usaram-na como forma de consulta e de contextualização.

Design da atividade

I - Achas que podia ter havido mais espaços para eles discutirem? Inicialmente tínhamos a tal ideia de fórum que não se chegou a avançar. Não sei se tens ideia se eles trocaram e-mails se geriam o grupo de alguma forma.

P28 - Alguns foram comunicando por e-mail, para entregarem elementos uns aos outros. Outros para se encontrarem pessoalmente (para as filmagens).

I - Achas que podia ser feito mais alguma coisa? Por exemplo, se… a questão [que queria colocar] era mais relacionada com a competição. Se achas que ter-se criado este grupos, se facilitou, se gerou competição entre grupos, se estiveram mais separados, se houve entreajuda entre grupos. Fazes ideia?

P29 - Acho que não houve assim tanta entreajuda entre grupos. Porque realmente cada um estava muito ocupado com aquilo que se estava a desenvolver. Não foi intencional, mas está implícita na partilha dos conteúdos desde o início.

I - Em relação à utilização do Korsakow, disseste que não era muito difícil, mas achaste que foi fácil de usar para a aprendizagem?

P30 - Acho que sim, que é muito fácil de usar inicialmente. Mas de usar com intenção já é preciso mais algum tempo para experimentar.

> **I – In what concerns Korsakow, you said that it was not hard to use, but woud you consider it easy to apply for learning purposes?**
>
> **P30 - I guess so, it is very easy to start using. However to use intentionally it requires some extra play time.**

I - Aspetos bons que realçasses na interface?

P31 - Trazer a necessidade de organização das bases de dados; possibilitar a demonstração imediata do que se está a testar; ser interessante mesmo com uma exploração básica; e ser muito interessante

com todo o potencial que tem (com outras abordagens em termos de interface, apresentações alternativas).

I - Aspetos maus?

P32 - Alguns bugs, e a FAQ online não ser assim tão desenvolvida quanto isso, os erros não estarem documentados e descritos. Aqui a comunidade não me pareceu partilhar muito pormenores, como acontece noutras comunidades de *open-source*.

I - Em relação a adaptarem-se à ideia ou às lógicas não lineares e às estruturas semânticas, achas que essa componente foi mais difícil eles chegarem lá?

P33 - Foi facilitada por terem trabalhado muito com os mapas conceptuais antes. Foi difícil para eles (pelo menos para mim) não estavam muito familiarizados com a organização dos dados no computador a criação dos ficheiros e instalação das aplicações e ficheiros fonte e apresentações finais.

I - Achas que usavas outra vez o Korsakow nas aulas?

P34 - Sim, Não como aqui em que foi uma das aplicações principal. Daria outras aplicações alternativas.

I – Bad issues (concerning the interface)?

P32 - Some bugs and the fact that online FAQ is not that much developed, errors are not documented or described. In this case the community does not seem to share many details, as it happens in other open-source communities.

I - In what concerns their adaptation to non-linear and semantic structures, do you consider that it was difficult for them to get there?

P33 – … "Working with conceptual maps contributed much. It was hard for them (in my view) they were not familiarized with managing data in computers, creating files, installing applications and font files or (creating) final presentations."

I – Would you use Korsakow again in class?

P34 – Yes. Not like this as the main application. I would also propose alternatives.

I - E para projetos teus? Projetos pessoais?

P35 – Sim, eu tenho vontade de utilizar. Mas entre fazer com o Korsakow e utilizar aplicações próprias, tenho preferido usar as [minhas] aplicações próprias. Mais pelas limitações em termos de publicação. Se eu vou publicar os meus projetos no Korsakow, (o vídeo) começa logo com aquela introdução do Korsakow e (não me convém) se vou utilizar numa exposição… é bom como ferramenta e como demonstração. Para ter a aplicação já a correr tudo bem, mas estar a reiniciá-la por exemplo…

I - Achas que podia ser melhorada a aplicação para uso nas aulas? Algum aspeto que achas que

pudesse ser melhorados?

P36 - Sim. Os tutoriais que não tivessem só aquele exemplo, com os homens todos iguais e com as mulheres todas iguais. Que eu acho que não facilita nada estarmos a mostrar que estamos a fazer ligações com nomes diferentes com bonecos iguais. Haver alguns exemplos reais estarem documentados, como acontece nas tais comunidades de *open-source*, em que os autores mostram ficheiros com exemplos comentados. Isso era bom. Exemplos mais complexos.

I - E mesmo em relação à aplicação em si? Achas que pode haver alguma coisa que podia facilitar a vida ao professor ou ao aluno?

P37 - Permitir uma melhor otimização dos pesos [tamanho dos ficheiros] e da qualidade [do vídeo] quando [publicamos] online. Parece que depois não fica com tanta qualidade como nós desejaríamos. Essa era uma questão mais técnica. Conseguirmos ter mais controlo sobre a ordem como aparecem os clips em baixo. Independentemente daquele rating ou força que cada clip tinha. Poder ter uma interface com vários projetos. Por exemplo gostava de fazer um projeto comum juntando vários projetos com um menu comum.

I - Em relação a estratégias para atingir os objetivos. Achas que eles conseguiram desenvolver essas estratégias?

P38 - Sim, acabaram por concretizar isso. Não houve assim grupos que mostrassem frustração…

I - Em relação à atividade em si. Aquilo que conseguimos montar nestes dias. Usarias [outra vez] esta atividade desta forma? (Em próximos semestres)

P39 - A galeria online?

I – Tudo. Eles usarem o Korsakow nesta lógica com algum tempo para pensarem nos temas.

P40 – Sim, acho que no essencial sim.

> **I – Concerning the activity. What we managed to do these days. Would you use the activity [again] the same way? (In following semesters) (…) Students using Korsakow in this manner with much time to think in subjects.**
>
> **P40 – Yes, I guess the essential yes.**

I - Mas alterarias algumas coisas? (Tinhas falado que se calhar oferecias ou proporias que escolhessem outras aplicações)

P41 – (Um aspeto que talvez mudasse) era mostrar aspetos da organização dos ficheiros dentro da aplicação. E antes disso mostrar (reforçar a localização dos) ficheiros fora.

I - Recomendarias a outro professor esta atividade ou este tipo de atividades?

P42 - Com as devidas salvaguardas. Como ferramenta para exploração e para experimentar e para utilização mais ou menos descomprometida e com imenso potencial. Não é assim usar acriticamente.

I - E achas que se aplicaria a algumas disciplinas e a outras não? Ou vias que isto de certeza que não ia fazer sentido em disciplinas mais teóricas?

P43 - É. Aplica-se só a algumas disciplinas. O ter que lidar com estes media, com o vídeo e com imagem, ilustração, talvez não seja… Depende. Para aprender a lidar com a ferramenta e a utilizar sim faz sentido nestas disciplinas de metodologia projetual e introdução ao projeto multimédia. Para utilizar em disciplinas teóricas já é bom que eles estejam super à vontade com a ferramenta. A partir de agora já será interessante utilizarem noutras disciplinas. Sim.

I - Numa fase exploratória só fará sentido numa disciplina mais prática?

P44 – Sim, com uma prática mais acompanhada, se um professor de teoria disser " Está aqui a aplicação e estão aqui os tutoriais, e agora quero que um dos três trabalhos do semestre seja um vídeo interativo sobre este tema" Eles (desta forma) vão sentir logo alguma dificuldade em começar.

I - Em relação à maneira como isto foi aplicado, achas que valeria a pena ter tido mais formação inicial de como utilizar a própria aplicação. Uma das questões que tu levantaste foi o antes, como se estrutura uma pasta dento do computador. Mas mesmo sobre a utilização da aplicação. Achas que valeria a pena ter tido mais informação sobre a exportação…

P45 - Sim, componentes do projeto que não houve muito tempo para explorar posteriormente. Os títulos, a exportação, como são publicados, a inserção de texto conteúdos em português que não estão bem traduzidos, a questão da legendagem.

I - Ok, acho que estão respondidas as 24 questões.

P46 - Também não foi muito estimulada a utilização de interfaces alternativas. Há parte do projeto de *Barcarena* em que os *thumbnails* estavam distribuídos ao longo do mapa. E eles resolveram essa situação e está muito bem.

I – Ok. Obrigado.

Metodologia Projectual Multimédia

FASE 2 - KORSAKOW

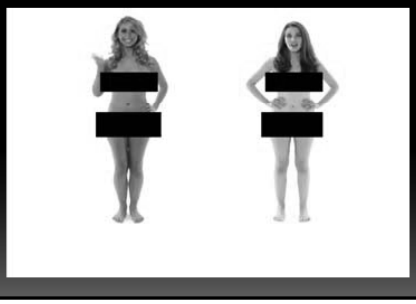
António Maneira – 08/11/12 – Faculdade de Belas-Artes da UL

Actividades de aprendizagem com edição multimédia semântica

- Dois inquéritos (um no início e outro no final);
- Uma sessão de brainstorming/focus group;
- 3 a 4 observações de utilização da aplicação;
- Entrevista.

E-mail: [redacted]
Telemóvel: [redacted]

Dress Us! (Interactive Video)

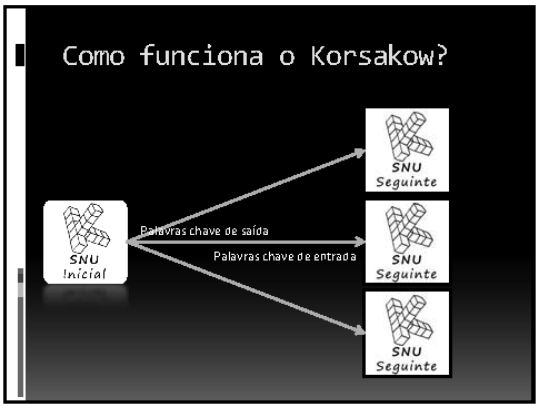


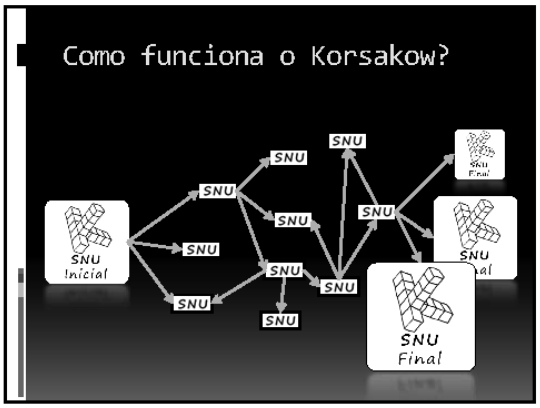
How To Make An Interactive Adventure!

The Birthday Party: An Interactive Adventure!

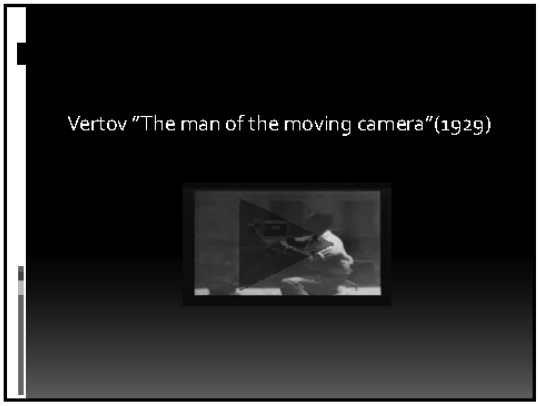
Aplicação para criação multimédia com lógicas semânticas

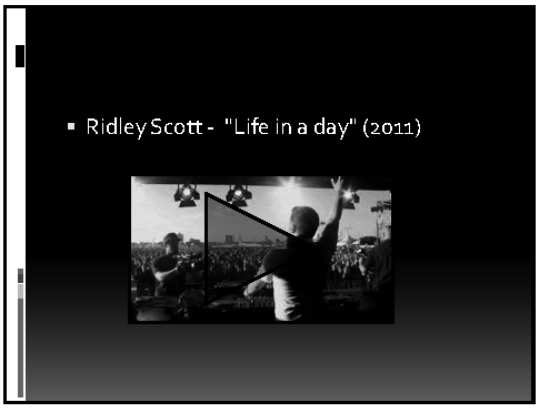
KORSAKOW
Home of the SNU

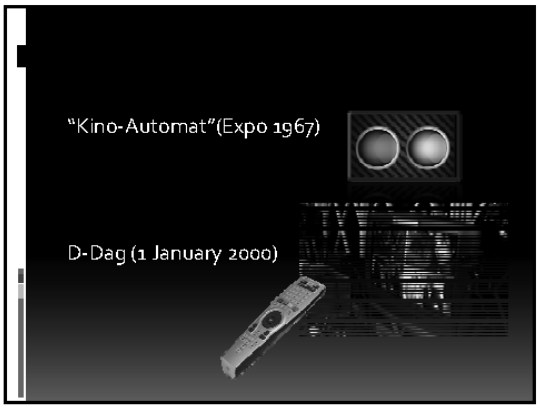

Como funciona o Korsakow?
SNU Inicial
Palavras chave de saída
Palavras chave de entrada
SNU Seguinte
SNU Seguinte
SNU Seguinte

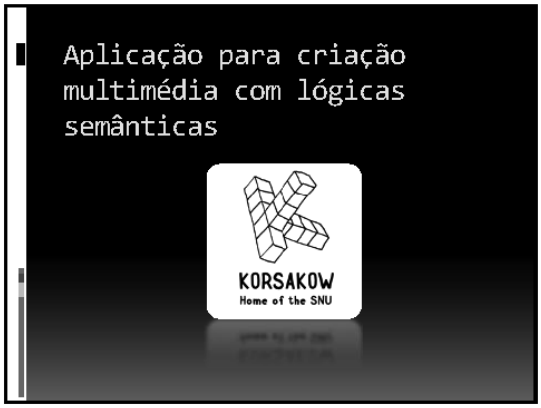

Como funciona o Korsakow?
SNU Inicial
SNU
SNU Final

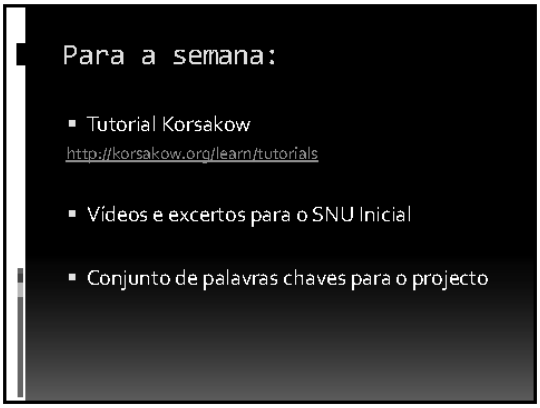

K-Film example
"The Border Between Us"


Vertov "The man of the moving camera"(1929)


Ridley Scott - "Life in a day" (2011)


"Kino-Automat"(Expo 1967)
D-Dag (1 January 2000)


Aplicação para criação multimédia com lógicas semânticas
KORSAKOW
Home of the SNU


Para a semana:
Tutorial Korsakow
http://korsakow.org/learn/tutorials
Vídeos e excertos para o SNU Inicial
Conjunto de palavras chaves para o projecto

Professor's Final Interview of 2012

Lisbon, January 17th, 2013

Some framing questions were translated from Portuguese to English by the author along the text and are presented in **bold** (**P 11, 12, 17, 21, 24, 25, 26, 29, 30, 34, 50, 51, 56, 58** and **59**).

Atitudes e competências dos alunos

Investigador - Como entrevista final o objetivo é também perceber a evolução dos alunos e da própria utilização da aplicação. Já tiveste a experiência do ano passado, e claro também podes comparar com o ano passado. Uma das coisas que queria também confirmar [é se] o ano passado foi a primeira vez que usaste o Korsakow nas aulas?

Professora 1 - Sim, para ensino sim. No entanto um colega [meu] já usava com os alunos dele. Foi a primeira vez que eu lecionei aquela disciplina. O ele já desde há dois anos. Eu antes de começar a dar aulas, comecei por fazer as avaliações com ele, e a aperceber-me dos trabalhos que eles faziam.

I - Só uma questão em relação aos alunos. A maior parte dos alunos são do segundo ano?

P2 - A maior parte dos alunos são do segundo ano de *Ambientes Interativos*. Alguns escolheram esta cadeira como opcional.

I - Nenhum do terceiro ano?

P3 - Do terceiro ano não. Tenho dois de Erasmus.

I - A primeira questão (da praxe) é: se sentiste alterações na evolução utilização da internet e das tecnologias em geral?

P4 - Sim, de uma maneira geral senti uma evolução. Um ou outro aluno mais familiarizado, investiu mais na parte do tema e do conteúdo do projeto. Outros evoluíram bastante e ficaram mais à vontade com as estruturas não-lineares. Perceberam a ideia de tirar partido das estruturas não-lineares e contar as histórias de maneira diferente.

I - Em relação à internet achas que alguns alunos ficaram mais à vontade? (Usar o blog, fazer pesquisas online,…).

P5 - Sim, bastante mais à vontade. Eles já estavam mais familiarizados depois de terem tido a disciplina de "Meios Digitais" comigo no ano passado, onde houve uma familiarização com a publicação no blog, e este ano parti do princípio que eles já estavam à vontade com a publicação.

I - Portanto a maioria dos alunos já tinha tido a disciplina de "Meios Digitais"?

P6 - Sim, os de *Ambientes Interativos*, dois terços.

I - Que é um semestre também?

P7 - Tinham que publicar os trabalhos finais e também tinham que fazer mapas conceptuais. Já estavam mais ou menos familiarizados.

I - És a professora dos mapas conceptuais?

P8 – É, mais ou menos.

I - Portanto só os de Erasmus…

P9 - Desde que comecei a dar aulas os alunos sempre fazem mapas conceptuais na primeira aula, sobre as expectativas da disciplina e na última aula, sobre comentários, sugestões e palavras-chave.

I - Em relação à motivação? Achas que eles se motivaram ao usar o Korsakow?

P10 - Sim. Gostaram de usar como ferramenta.

I - Eles já vinham com ideias de usar a ferramenta, desde a primeira aula?

P11 - Não, alguns estavam na expectativa de que iam fazer web design e ou similar.

I - Em termos de atitudes com essas aplicações, e com a edição de vídeo por exemplo: achas que eles se sentiram mais à vontade?

P12 - Sim. Acho que eles até se podem ter surpreendido a eles próprios com os resultados. Foram conseguindo gradualmente. Assim não se assustaram com o compromisso de fazer um vídeo interativo. Foram fazendo por etapas. [Para] alguns foi difícil começar a usar a aplicação, mas depois quando começaram já conseguiram dominar melhor em relação aos objetivos.

> **I – Did they [students] come with the idea they would use the tool [Korsakow] since the first class?**
>
> **P11 - No, some were expecting to do mostly web design.**
>
> **I – In what concerns attitudes toward those applications and video editing, do you think they were more at ease?**
>
> **P12 - Yes. I believe they might have surprised themselves with their own achievements. Progress was gradual. In this way they were not scared with the commitment of making an interactive video. They made it stage by stage. At start it was difficult for some to use the application, but then they could master it better regarding the objectives.**

I - E em termos de narrativa achas que melhoraram as noções de como contar uma história? Dentro destas lógicas não lineares?

P13 - Sim, acho que a maioria evoluiu nos projetos no sentido de contar uma história, de uma experiência do utilizador, de proporcionar uma experiência aos utilizadores que fosse gratificante. Uns [alunos] que por exemplo tinham os SNUs a passar infinitas vezes, e [questionavam-se] o que é que o utilizador vai ganhar com isso (ver várias vezes o mesmo vídeo), então repensavam a

estrutura. Outro caso por exemplo, o João, queria fazer tudo aleatório, usufruir do aleatório da aplicação, mas depois ele próprio descreveu que se tinha inspirado, e tinha criado três grupos de referências, e reformulou a interface dele de acordo com esses três grupos, por exemplo. Mesmo mantendo uma abordagem abstrata com o aspeto aleatório, orientou melhor a sua história. O das marés também, dentro da sua subjectividade (das emoções com a água), procurou contar uma história. Alguns procuraram criar uma situação de jogo.

I - Portanto achas que a maior parte teve um mais ou menos a noção de como é que funciona o Korsakow e conseguiram dar alguma estrutura?

P14 - Sim.

I - Acabei por ainda não ver todos. Julgo que o do João ainda não cheguei a ver.

P15 - Agora está mais simples na galeria final.

Resultados dos alunos

I - Os projetos ficaram todos publicados?

P16 - Sim, sim. Hoje houve uma aluna que publicou o seu trabalho (bastante atrasada). E os dois últimos são bastante mais fracos. Não foram sequer acompanhados nas aulas, poderás ver as diferenças em dois projetos entregues por alunas que não vieram a metade as aulas. E que fizeram o projeto de uma forma independente. Falamos nisso, se põem os vídeos a passar infinitas vezes não melhora a experiência do utilizador.

I - Quando avalias os projetos observas as palavras-chaves que eles usaram?

P17 - Em muitos casos eu não tive acesso aos ficheiros de criação. Por isso as palavras-chave dos SNUs foram acompanhadas durante o processo de desenvolvimento. E aí, sugeri que eles as conseguissem orientar de forma menos abstrata. Mas essas palavras-chave estão de alguma forma explícitas nos mapas que eles criaram, e aí então, se formos ver uma primeira versão de mapas, as ligações estão muito mais difíceis de perceber ou estão muito mais abstratas, e noutra versão estão muito mais controladas e mais intencionais, e identificadas. Um dos problemas desta aluna (que entregou agora) por exemplo é o facto de [a] cada SNU [atribuir] uma letra do alfabeto (ABCDE…) e depois [ela fez] uma palavra a ligar com todas as outras. E então não criou história nenhuma.

I - When evaluating projects you look at the used keywords?

P17 - In several cases I did not have access to the authoring files. Therefore SNU keywords were discussed in the development process. There I suggested them to create keywords in a less abstract way. These keywords were somehow expressed in the maps they created. Then, if we look to a first map version, connections are hard to understand and much abstract, while in later versions they are a lot more controlled, intentional and identified. One of the problems of this student (that only now delivered [her work]) is, for example, attributing alphabet letters to each SNU (ABCDE…) and then (what she

did was) one letter linking to all other. As a result she did not developed any story.

I - Tu soubeste disso porque ela te disse?

P18 - Não, no próprio mapa conceptual há uma correspondência nos nomes que eles dão e os nomes que eles usam depois. Foi uma sugestão na aula: que quando fizessem os mapas com a estrutura, dessem nomes aos ficheiros e que esses nomes pudessem ser nomes de ligação para conseguir identificar com conteúdos, porque senão, iriam perder-se.

I - Mas portanto mesmo alguns alunos que não tenham vindo a todas as aulas foram publicando os vários pedidos que tu fizeste?

P19 - Sim. Havia alunos que vinham à aula só uma vez por semana e que foram fazendo o projeto também.

I - Eram trabalhos de grupo ou a maior parte eram trabalhos individuais?

P20 - Individuais. Só houve dois trabalhos de grupo.

I - Dentro desses grupos deu para avaliar a interação entre eles? (Se foi boa?)

P21 - Foi mais complementaridade. Houve um elemento do grupo que assumiu mais a utilização da ferramenta Korsakow e outro que trabalhava mais outras componentes. Eles aperceberam-se que para eles era difícil estar a transferir os ficheiros para um lado e para o outro e estar a trabalhar ao mesmo tempo num mesmo projeto. Então pronto… Se pudessem trabalhar colaborativamente online…

I - Within these groups was it possible to evaluate their interaction? (Was it good?)

P21 - It was more complementarily. There was one element within the group that assumed working with Korsakow tool and the other worked other components. They realized it was difficult for them to transfer files from one place to the other and working at the same time in the same project. That's that… If they could work collaboratively online…

I - Portanto tens a noção de que se ajudavam dentro dos grupos fazendo partilha de ficheiros?

P22 - Os que fizeram em grupo era mais quando se encontravam na aula. Também eram só dois grupos de duas pessoas cada grupo.

I - Em relação aos outros, achas que se ajudaram uns aos outros em termos de solidariedade inter-projetos?

P23 - Durante a aula sim, havia sub-grupos. Sobretudo quem já tinha ultrapassado alguma dificuldade, eu própria endereçava para esse aluno.

I - Tu própria com os alunos tinhas um certo à vontade. Por exemplo para os encaminhares uns para

os outros. Deu para observar que era mais ou menos informal a maneira como te tratavam. Cordialmente mas de certa forma informal.

P24 - Sim, pu-los à vontade se houvesse alguma dúvida que um colega já tivesse superado; preferia que fossem esclarecer com o colega do que estar eu a repetir. Para [assim poder] estar disponível para os outros alunos. Mas por outro lado era também para lhes dar essa responsabilidade e esse à vontade de poderem esclarecer uns com os outros. Tanto que eu também não sou especialista com a ferramenta, exploro com eles…

I - Uma das coisas que também consegui ver foi a tua maneira de gerir ou de interagir diretamente com os programadores, essa ideia de contribuir com o projeto *open-source*…

P25 - Sim. Por um lado já tinha havido deteção de bugs em situações anteriores, e por outro lado, quando me colocavam questões que eu não conseguia ultrapassar na aula, eu levava para esclarecer. E eu própria coloquei uma questão aos autores depois de ter procurado no fórum um pouco mais a solução para aqueles problemas; e seguindo todas as regras, questionei os próprios autores. Mandei para o contacto geral e eles todos têm acesso. E depois foi eficaz no esclarecimento. Isto levou a que eles próprios [os alunos] consultassem [o fórum], uma vez que no fórum uma pessoa tinha que se registar. E havia um e-mail onde a pessoa podia enviar as suas questões. Na verdade houve um [aluno] a contactar diretamente os autores.

I - Houve um aluno?

P26 - Sim houve uma aluna, e ficou muito surpreendida e satisfeita que responderam no próprio dia e logo a seguir; e foi muito interessante porque ela colocou uma questão que terá sido um desafio interessante, uma ideia mais original. Obteve resposta dos três elementos mais envolvidos no projeto, esse dia e no dia a seguir, com sugestões. O Matt foi o primeiro a dizer que realmente não daria para fazer aquilo que ela estava a querer e para fazer então a versão alternativa que ela estava a sugerir. O Florian respondeu a confirmar. (Eles estavam também a aproveitar para falar entre si). O Dave depois respondeu com uma hipótese que ainda não tinha sido testada e [que sugeriu] para ela experimentar. Essa versão resultou. Não era só a parte dos links fixos. A ideia era poder usar o Korsakow para fazer um projeto de vídeo interativo que fosse uma espécie de mesa de mistura de sons. E essa hipótese resultou.

Q24 - Yes, I supported students to be at ease to check doubts with partners that would be more advanced; I preferred that they would learn with their peer than being repeating myself. In this way I could be available for others. But also it was a way of giving them that responsibility and attitude of learning with each other. Besides I am not a specialist with this tool I explored with them…

I - One thing I noticed was the way you managed to directly interact with the developers, that idea of contributing for the *open source* project

Q25 - Yes. In one way there had been some bug detection earlier and also, when they

asked me questions that I could not answer in class I took them home for checking. After going through the forums for the same kind of problems (and following all rules) I presented a question to the authors (the programmer).(…) He was effective lightning up the subject and I made them [the students] see the conversation.(…). But the truth is that there was one (student) contacting the authors directly.

I - Was there a student?

Q26 – Yes, there was one student, and she was quite surprised and glad as they responded in the same day; and it was quite exciting as her question was considered very original and appealing challenge. She got an answer from the three most involved elements in the project latter that day and the day after with suggestions. Matt was the first to claim that what she was suggesting was not possible but that an upgraded version should be made to enable it. Florian confirmed (they were also talking with each other). Dave (the programmer) replied suggesting the alternative version still to be tested. It worked. It was not just the fixed links. The idea was to use Korsakow to make an interactive video that would be a kind of a sound mix table. And it worked.

I - Achas que a maior parte se empenhou nos projetos?

P27 – Sim. Acho que eles depois acabaram por se entusiasmar bastante com a utilização e com o domínio dos comportamentos (que tinham de ser eles a controlar). Houve vários projetos que tiveram várias iterações e que foram melhorando ao longo do tempo (entre o primeiro mapa e depois o resultado final).

I - Tiveste a experiência de os ter como alunos no ano passado. Consegues ter ideia ou fazer a comparação em relação a outras atividades? (Se achas que estiveram mais entusiasmados com isto [o Korsakow] em vez de outra aplicação qualquer).

P28 – Sim. O facto de ser interativo e poderem começar a mexer com comportamentos, à partida entusiasmava-os mais e está mais próximo dos objetivos deles que é criarem projetos interativos. Faz parte da evolução.

I - Em relação ao resultado final dos trabalhos (não estive a ver as notas imagino que também não seja o mais importante, mas) achas que os projetos atingiram os objetivos?

P29 - Todos eles poderiam ter uma nova iteração [ainda]. Todos eles poderiam ainda melhorar para além do que estão. Mas a verdade é que numa evolução de 4 etapas, a maioria está numa etapa 3. Mas sim, tiveram uma boa evolução. O facto de o ano passado ter havido um projeto Korsakow e ter servido como referência para os alunos irem observar e partirem das suas ideias e do que os colegas tinham feito também tornou as propostas deles mais arrojadas, mais exploratórias. No ano passado havia muitas pessoas que utilizavam a interface convencional (um vídeo principal e 3 de

opção) que vinha por omissão na aplicação, e agora, este ano, houve muitos que alteraram. Inspirados sobretudo pelos casos mais diferentes (como por exemplo Barcarena, com o mapa).

I - Em relação à própria evolução do projeto. Achas que os ajudou a entender ou perceber melhor os conceitos, ou aquilo que estavam a abordar? Que durante a evolução do projeto, eles próprios foram desenvolvendo conhecimentos na área?

P30 - Do tema? Sim. Houve alunos que fizeram visitas de estudo ao local que foram filmar, e acabaram por concretizar informação sobre esse tema. Outros que foram (pesquisar) vídeos online e acabaram ser eles a coordenar e [a] filtrar que informação é que queriam mostrar ao seu público. Outros que para procurar formas de sensibilização ambiental, também procuraram saber mais, para poderem não só apresentar aqueles vídeos mas também perspetivar. Ou seja, apresentar: "Isto é o que temos neste vídeo; se todas as pessoas fizessem assim as consequências seriam estas…"

> **P29 - (…) "The fact that Korsakow projects were developed last year and that they were used as reference for students (…) made their proposals bolder and more exploratory. Last year there were lots of people using the straight interfaces (…) (by default), and now, this year, there were many [students] that changed it. Mostly inspired by more original projects."**
>
> **P30 - (…) "There were students who did study visits to the place they would be shooting and gathered information about the theme. Other that [searched] online videos, managed and filtered the information they wanted to show to their audience. Others, in order to promote environmental awareness, made much research for being able to put videos they found in their own perspective. As an example; 'this is what we have in this video; if everyone would do like this the consequences would be that…'"**

I - Tentaram ir mais a fundo. Viram um vídeo e procuraram mais informações. Em termos de criatividade, disseste que partiram já da observação de alguns trabalhos. Mas de certa forma criaram coisas novas em relação ao que viram?

P31 - Sim. Por exemplo, na história dos jogos era para ser uma estrutura linear para apresentar os jogos, acabou por haver abertura para fazer uma figura de um jogo a ser eliminada. Por um lado, funciona como experiência do utilizador, por outro é uma abordagem mais criativa. Outro, por exemplo, que tinha uma imagem de referência que era uns desdobráveis (turísticos) de uma zona, desenvolveu ilustrações não como vídeos mas como ícones, imagens para clicar.

I - Em relação a estratégias de trabalho: achas que o facto de estarem neste projeto promoveu novas formas de trabalhar? Em conjunto, uns com os outros?

P32 - As estratégias de trabalho foram muito orientadas pelo estado do programa. Como reparei que o ano passado os alunos estavam a focar muito no resumo, o resultado da disciplina, na concretização do Korsakow, este ano nem as etapas tinham número, eles tinham que ter

componentes do projeto no final de cada etapa. E então eles acabaram por pôr em prática as várias etapas que foram sugeridas. O trabalho acabou por não ser assim tão espontâneo, mas muito aquilo que já estava planeado. Eles tiveram que a apresentar o seu projeto e se apresentar aos colegas cinco vezes ao longo do semestre.

I - Achas que isso estimulou a interação entre os alunos?

P33 - Na prática logo na primeira apresentação da investigação houve alunos que deram sugestões uns aos outros. Mas depois naquelas etapas intermédias, não foi estimulada tanta interação durante a apresentação, mas mais pela inspiração que cada um poderá ter tido dos colegas (a influência que recebeu).

I - E achas que essa troca contribuiu para uma certa competição entre eles? (com esta ideia de que aproveitaram de certa forma o trabalho uns dos outros) Havia a ideia de querer fazer melhor?

P34 - Competição entre eles, não me pareceu assim tanto. Também motivei abertura para colocarem questões uns aos outros e para responderem às dúvidas uns dos outros, consoante aquilo que cada um já tinha avançado. Quando havia uma dúvida de um também passava esse esclarecimento para todos. Por isso acabou por haver mais entreajuda e inspiração em comum do que competição. Cada um tinha uma abordagem muito diferente. Uma aluna estava mais vocacionada para publicidade e propaganda, outro para uma exploração mais abstrata, outro para aproveitar para fazer experiências com líquidos.

> **P34 - "I supported open collaboration for students to question each other and help each other. (…) Therefore, it ended to be more mutual help and inspiration than competition. Each [student] had a very different approach. One student would have a commercial project, while other would have a much abstract exploration, and other focus on fluid experiments."**

I - Portanto muito focados nos seus projetos sem ter em mente propriamente uma nota final que iam ter? Ou em relação uns aos outros?

P35 - Era difícil [para os alunos] terem uma ideia das notas ao longo das etapas (da nota final ao longo das etapas). [Podiam apenas] comparar os projetos.

I - Mas ao longo de cada uma dessas etapas os comentários que fazias não eram numéricos?

P36 - Eram mais do trabalho em curso. Não era tanto o feedback quantitativo, mas aquilo que podiam melhorar. Os projetos podiam sempre melhorar.

I - Mas houve uma certa pressão para que eles entregassem essas respostas no final de cada etapa. Se não entregassem acabava o projeto, não valeria a pena continuar? Ou havia uma penalização?

P37 - Não. Eu falei que havia uma penalização em relação aos prazos. Uma penalização quantificada em meio valor se não apresentarem à turma. Isso em cinco apresentações dá dois valores e meio no total.

I - Esta metodologia usaste também o ano passado?

P38 - Usei. Tinha menos etapas. Mas isto não era para quantificar. A questão dos prazos era geral mas depois como havia tantos alunos e tantas etapas eu tive que subdividir tudo para conseguir ter uma avaliação justa de alunos que fiquei a conhecer bastante mal por não haver muitas oportunidades de interação. Eles sabiam que havia uma penalização no final.

Utilização do Korsakow

I - Em relação ao Korsakow: nesta última versão sentiste haver melhorias em relação ao ano passado?

P39 - Nós salvaguardámos mais. No ano passado, tivemos mais problemas sobretudo em relação aos formatos dos vídeos dos nomes dos ficheiros. Essa parte foi logo salvaguardada. E eu primeiro fiz logo esse aviso de que deveriam ter os vídeos formatados segundo aquelas condições. Sobretudo iriam ter problemas na exportação final, como já tinha acontecido em situações anteriores. Depois quando havia um problema logo nas primeiras fases, essa era uma das situações que eliminávamos que era os formatos dos vídeos. Então se formos ver os esclarecimentos da utilização da ferramenta, começam logo por dizer [isso]. Quais os formatos que eles devem usar. E depois mais à frente ferramentas para poderem fazer a conversão. São este tipo de sugestões.

I - Em relação à própria interface do Korsakow. Não foram explorados na aula todos os passos a fazer (tenho ideia).

P40 - Mostrei tutoriais. Aquele tutorial inicial para a introdução e depois o tal exemplo que já tinha realizado [um vídeo interativo realizado pela professora]. Não foi mostrado assim em pormenor cada uma das etapas. Mas foi incentivada a exploração da interface, que não fiz muito o ano passado.

I - Achas que eles se adaptaram bem ou tiveram dificuldade. Em gerir a criação de interfaces…

P41 - Em geral eles conseguiram ultrapassar, sim.

I - E em relação ao próximo ano? Pensas usar outra vez?

P42 - Já questionámos isso no balanço final, um dos alunos comentou isso que o Korsakow tinha muitos problemas, mas os outros não levantaram esse problema. Eles também podiam escolher outra ferramenta como aconteceu com dois casos. Eu estava curiosa para experimentar outras ferramentas ou para deixar em aberto a utilização de outras ferramentas, para também não concentrarmos a ideia de projeto multimédia num vídeo interativo, feito com a ferramenta x. Falámos também em utilizar a solução Popcorn (https://popcorn.webmaker.org/), que permite sincronizar vídeos e colocar ligações entre um e outro. E assim eles também quando tem opções entre ferramentas, é uma oportunidade para explorarem ambas. E fazerem uma opção mais consciente. E então aí vão ter de experimentar ambas para poderem escolher qual usar efetivamente. Então estou a pensar nessa hipótese. Mas o Korsakow tem sido bastante confortável e adequado para por em prática esta ideia de projeto multimédia e de fazer mapas conceptuais ao longo das fases iniciais, fazer pesquisa, criar comportamentos, pensar no utilizador.

I - Adapta-se a estas várias coisas…

P43 - Sim, a ideia de o projeto final ficar no ecrã e ficarem todos ao mesmo nível e serem explorados na web. Pode mostrar assim um resultado bastante circunscrito. Se calhar vou estimular mais a utilização de mais ferramentas em paralelo mais orientadas para a web. Ou então pode ser mais interessante a apresentação final, o ambiente onde é apresentado, o projeto ser mais diversificado [como por exemplo] poder ser explorada a utilização de projeções.

I - Achas que é importante esse salto para o exterior?

P44 - Sim. Ambientes com outra escala. Uma interface física diferente. Trabalhar com sensores.. apenas num semestre não dá para chegar a essa fase… Se tivéssemos um segundo semestre evoluiríamos para essa exploração.

I - Achas que o só estar online é pouco visível.

P45 - É o meio ideal. Se só houver um meio possível é o meio ideal. Para depois extrapolar para os contextos que quiserem.

I - Achas que é uma hipótese comprimir um bocado mais o tempo para a produção de vídeo?

P46 - Sim, se eu apresentar soluções pré-definidas. Do género: “temos aqui várias hipóteses para explorar: está aqui o espaço, está aqui o ambiente preparado, estão aqui estas várias opções”; ou “[vamos] usar o computador: já está aqui o código só têm de adaptar ao vosso caso”. Se tiver alguns modelos pré-definidos que eles adaptem é possível. E aí eles fazem… primeiro utilizam a ferramenta fazendo apenas uns ajustes e depois ficam mais curiosos para saber como é que se faz.

I - Mas isso já à parte do Korsakow? Ou tentar integrar o Korsakow com esses meios?

P47 - Podendo utilizar o Korsakow como ferramenta.

I - É mais complicado porque é mais um nível? (Programar em cima do Korsakow.)

P48 – Sim.

I - Aí se calhar era mais complexo prever as várias hipóteses de criação?

P49 - Estava a considerar… Não íamos pedir que eles trouxessem novas profundidades para o Korsakow. Nós é que tentaríamos a utilização da interface [com sensores] com a interface do Korsakow. Que a nossa interação com o Korsakow não fosse com um rato no computador, [mas com] estes dispositivos e sensores. O Korsakow continuaria a funcionar como é.

Design da actividade

I - Em relação às virtudes da utilização da aplicação mas mais do ponto de vista da atividade em si, se achas que isso é uma fraqueza, não ter essa exposição não haver tempo para mais? E um forte, alguma coisa que consideres bastante positiva?

P50 - Uma das coisas bastante positivas é os alunos poderem ter a oportunidade de poder criar

comportamentos sem terem de saber programar. E conseguem fazê-lo rapidamente. Poderem sentir-se entusiasmados com essa possibilidade. E aí também começam a poder criar uma história com a interação que eles planeiam. O forte é poder trabalhar estruturas não-lineares de forma bastante simples em termos técnicos. E bastante entusiasmante em termos de resultados. E então ai eles concentram-se na componente visual e na história que eles querem contar. E uma das componentes que eu quero dar mais destaque é na experiência do utilizador. Daí ser uma das etapas. Eu coloquei a experiência do utilizador como uma das etapas que está subentendida no desenvolvimento. Mas sendo uma etapa independente, eles têm de fazer testes e trazer a experiência do utilizador como uma das componentes nas quais tenham refletido e que tenham partilhado.

I - Eu lembro-me de tu falares da hipótese de fazer uma maquetagem com papel. Qualquer coisa para eles se entenderem. Pelo menos em alguns projetos parecia que não estavam a perceber bem como é que ia funcionar. Portanto uma das tuas ideias seria pedir para que fizessem uma coisa desse género?

P51 - Sim. Cada vez que eu trago uma etapa nova, também pode não ter ainda uma expressão muito rica. Desta vez foi a divulgação. Achei que o Korsakow ficava muito fechado muito circunscrito aqui, ao que eles publicavam nesta plataforma. Então o facto de eles terem que divulgar (nas redes sociais) acaba por ser uma extensão possível do programa. Mas não foi assim tão bem sucedido. Acabaram por divulgar nos seus *facebooks* nos ambiente onde estão confortáveis e não arriscar a apresentar noutros contextos. Mas essa parte da divulgação também vai ser um dos elementos que dá mais perfectivas para terem *feedback*.

> **P50 - One of the very positive things is the fact that students can have the opportunity to create behaviors without knowing how to program. And they can do it fast. And be enthusiastic with that. (…) The good thing is to be able of working non-linear structures in a very easy way, in what concerns technical knowledge. And being very enthusiastic, in what concern results (…) One component I want to emphasize is the user experience, being one of the stages. (…) being an independent stage they [students] will have to make tests and bring user experience as one of the components in which they have given though and have shared.**
>
> **P51 - (…) Students ended advertizing [their projects] in their facebook page and the environments where they were comfortable and did not risk to present in other contexts.**

I - Houve pelo menos um aluno que publicou sem ser no blog da turma.

P52 - Eles tinham isso como uma etapa final.

I - Foi só fazer anúncio?

P53 - Sim.

I - Achas que vem mais da timidez de alguns deles?

P54 - Sim. Tal como também tiveram timidez em consultar os autores. Mas eles para os consultar também tinham que estar muito a par de todas as matérias.

I - Já agora como criadora do próprio blog tiveste noção de comentários que tenham sido feitos aos projetos para além dos próprios alunos?

P55 - Não. Aquilo foi muito fechado na turma. Também não fiz questão de divulgar o blog para além do contexto do trabalho da turma. No final houve alguns comentários a favorecer alguns trabalhos da turma. Apareceram alguns favoritismos… Há alguns projetos favoritos.

I - Chegou a haver comentários mas mais no final, não?

P56 - Sim. Quando eu insisti para que o fizessem. Eles têm sempre aquele receio de fazer comentários nas etapas do projeto e aos trabalhos dos colegas e que eles possam interpretar aquilo como críticas e não como ajudas.

I -There were comments but more in the end, right?

P56 - Yes. When I insisted for them to do it. They always have that apprehension of making comments to their peers work in the project stages as they are afraid they can take it as a critic and not an aid.

I -No final eles fizeram comentários mais positivos, só?

P57 - Sim. Só dos projetos que gostaram mais.

I – Uma das coisas que foi feito em Austin (….) foi fazer uma reunião e fazer comentários de acordo com seis categorias de crítica (…) Isso serviu de guião para depois eles fazerem comentários escritos aos trabalhos individuais. (…)

P58 – Eu gostei dessa ideia de poder expor os vários trabalhos nos computadores. Eu acho que podia resultar muito bem na tal fase de experiência de utilizador; porem os trabalhos no ecrã do computador e [usrem] um papel para os comentários. E aí eles vão ter de reunir os vários comentários (o melhor e o pior).

I - Lá em Austin partilharam um documento word, numa pasta no servidor, e assim era um word para cada um dos projetos.

P59 – Sim, até podia ser um Google doc ao lado…

P58 - I liked that idea of showing all the works in the computers. I believe it could work very well in that phase with the user experience; presenting the works on the computer screen and having a sheet of paper for the comments. And then each student would gather all the comments.

I - In Austin they shared a Word document, in a class folder in the server. In this way

there was a Word document for each project.

P59 - Yes, it could be done with Google doc by the side…

I - Em relação à exploração da internet para recolher vídeos. A maior parte recolheu vídeos online?

P60 - Foi muito equilibrado. Uns filmaram e editaram. E outros foram recolher à internet. Foi muito equilibrado mesmo. Quando foram buscar ficheiros referi para mencionarem as fontes. Se eles no projeto final não apresentarem as fontes ainda [seria aceite]. Mas pelo menos no processo [nas publicações do blog] estão lá as referências. E na descrição final acrescentaram: os vídeos foram retirados de…

Final Questionnaire in Lisbon (2012)

Most relevant questions and answers are translated from Portuguese to English by the author and presented in ***bold italic*.**

1. Média diária

#	Question	Menos de 1 h	1 - 2 h	2 - 3 h	3 - 4 h	4 - 5 h	5 - 6 h	Mais de 6 h	n	Mean
1	Estudar por livros?	7	1	0	0	0	0	0	8	1.13
2	Estudar com amigos?	6	1	0	1	0	0	0	8	1.50
3	Estudar online?	2	3	1	1	1	0	0	8	2.50
4	Fazer pesquisas na internet?	0	1	1	3	2	1	0	8	4.13
5	Ver vídeos online?	2	2	3	1	0	0	0	8	2.38
6	Ver televisão?	3	3	2	0	0	0	0	8	1.88
7	Ouvir música?	3	0	2	1	1	0	1	8	3.13
8	Jogar vídeo jogos?	7	1	0	0	0	0	0	8	1.13

Statistic	Estudar por livros?	Estudar com amigos?	Estudar online?	Fazer pesquisas na internet?	Ver vídeos online?	Ver televisão?	Ouvir música?	Jogar vídeo jogos?
Min Value	1	1	1	2	1	1	1	1
Max Value	2	4	5	6	4	3	7	2
Mean	1.13	1.50	2.50	4.13	2.38	1.88	3.13	1.13
Variance	0.13	1.14	2.00	1.55	1.13	0.70	4.70	0.13
Standard Deviation	0.35	1.07	1.41	1.25	1.06	0.83	2.17	0.35
Total Responses	8	8	8	8	8	8	8	8

2. A tua actividade este semestre

#	Question	Nunca	Mensal-mente	Semanal-mente	Diaria-mente	Várias vezes por dia	n	Mean
1	Usar um motor de pesquisa (Google, Yahoo!).	0	0	1	1	6	8	4.63
2	Ver ou ouvir música ou vídeo online (YouTube, Vimeo).	0	0	1	4	3	8	4.25
3	Seguir podcasts ou realizar download de músicas ou vídeos.	1	4	0	3	0	8	2.63
4	Usar o site da faculdade ou a página da biblioteca.	0	3	4	1	0	8	2.75
5	Participar em sites de redes sociais (Facebook, MySpace).	0	0	1	3	4	8	4.38
6	Jogar vídeo jogos online com outros jogadores (World of Warcraft, Poker, Halo, Call of Duty, Runescape).	5	3	0	0	0	8	1.38
7	Participar em plataformas de mundos virtuais (Second Life).	8	0	0	0	0	8	1.00
8	Partilhar fotografias ou vídeos (blogs, flickr, podcasts, vodcasts).	1	2	5	0	0	8	2.50
9	Usar internet no telemóvel.	1	1	2	4	0	8	3.13
10	Ler/Enviar e-mails.	0	0	1	3	4	8	4.38
11	Ler blogs, wikis ou fóruns de discussão online.	1	1	3	3	0	8	3.00
12	Escrever/Comentar em blogs, wiki ou fóruns de discussão online.	3	3	1	1	0	8	2.00
13	Participar em chats de mensagens de texto (iChat, aim, GoogleTalk, facebook chat).	0	1	3	0	4	8	3.88
14	Enviar mensagens SMS por telemóvel.	0	1	1	2	4	8	4.13
15	Participar em conversas (áudio/vídeo) online (iChat, Skype).	2	0	4	1	1	8	2.88
16	Usar o Twitter.	3	3	1	0	0	7	1.71

3. Relativamente às actividades associadas ao uso do Korsakow. Para cada afirmação à esquerda, por favor indica o teu nível de concordância.

#	Question	Concordo totalmente	Concordo	Não concordo nem discordo	Discordo	Discordo totalmente	n	Mean
1	Na generalidade eu gostei da atividade em que desenvolvemos vídeos interativos. *I enjoyed the overall learning activity where we developed interactive movies.*	1	6	1	0	0	8	2.00
2	O suporte técnico foi ajustado às minhas necessidades. *The technical support was adjusted to my needs.*	0	3	3	0	1	7	2.86
3	Fiquei satisfeito com o filme que desenvolvemos. *I was satisfied with the film I/we developed*	1	5	2	0	0	8	2.13
4	As actividades aumentaram a minha motivação para estudar on-line.	0	1	5	1	1	8	3.25
5	As tarefas eram desafiadoras. *The tasks were challenging.*	3	4	1	0	0	8	1.75
6	As actividades eram muito exigentes.	0	3	3	2	0	8	2.88
7	Considero a atividade uma perda de tempo.	0	1	1	5	1	8	3.75
8	Gostei da maioria dos projetos dos meus colegas.	0	5	3	0	0	8	2.38
9	Percebi a lógica de atribuição de palavras-chave dos trabalhos dos meus colegas.	0	5	3	0	0	8	2.38
10	Acredito ter aprendido alguma coisa a partir do trabalho dos meus colegas.	0	7	1	0	0	8	2.13
11	Os projetos dos meus colegas não me suscitaram interesse	0	0	1	6	1	8	4.00
12	Era fácil dispersar nas aulas porque o ritmo era lento	0	1	4	3	0	8	3.25

4. Em relação à tua experiência de utilização da internet e redes sociais, por favor indica o teu nível de concordância.

#	Question	Concordo totalmente	Concordo	Não concordo nem discordo	Discordo	Discordo totalmente	n	Mean
1	Foi difícil para mim encontrar recursos vídeo e imagens online.	0	2	3	3	0	8	3.13
2	A internet foi útil para trocar informação com outros colegas. *The Internet was useful to exchange information with others.*	3	3	2	0	0	8	1.88
3	Consegui encontrar formas de verificar a qualidade e validade dos recursos (vídeo e imagem) que escolhi para o meu projeto. *I could find ways to check the quality and accuracy of the media I chose for my project.*	1	4	2	1	0	8	2.38
4	O professor ajudou a desenvolver o meu projecto.	2	6	0	0	0	8	1.75
5	A comunicação com o professor foi apropriada. *Online communication with the teacher was appropriate*	1	6	1	0	0	8	2.00
6	Foi fácil partilhar informação e recursos (vídeo e imagem).	1	6	0	1	0	8	2.13
7	O trabalho de equipa foi bom.	1	2	5	0	0	8	2.50
8	Utilizei fóruns online para trocar informação fora das aulas.	0	2	1	2	3	8	3.75
9	Sinto-me mais informado sobre potenciais riscos associados à utilização da internet.	1	1	4	1	1	8	3.00

5. Em relação à tua experiência na edição e gestão de recursos multimédia, por favor indica o teu nível de concordância.

#	Question	Concordo totalmente	Concordo	Não concordo nem discordo	Discordo	Discordo totalmente	n	Mean
1	Não tive problema em editar os recursos que queria utilizar.	1	2	2	2	1	8	3.00
2	Tive dificuldade em desenvolver redes ou estratégias de atribuição de palavras-chave para o meu projecto.	0	4	2	2	0	8	2.75
3	Aprendi bastante vendo vídeos online.	0	4	2	2	0	8	2.75
4	Facilmente desenvolvi mapas de conceitos sobre os temas que quis abordar.	0	5	3	0	0	8	2.38
5	Foi difícil escolher as palavras-chave para classificar os recursos que queria utilizar.	1	1	0	4	2	8	3.63

Statistic	Não tive problema em editar os recursos que queria utilizar.	Tive dificuldade em desenvolver redes ou estratégias de atribuição de palavras-chave para o meu projeto.	Aprendi bastante vendo vídeos online.	Facilmente desenvolvi mapas de conceitos sobre os temas que quis abordar.	Foi difícil escolher as palavras-chave para classificar os recursos que queria utilizar.
Min Value	1	2	2	2	1
Max Value	5	4	4	3	5
Mean	3.00	2.75	2.75	2.38	3.63
Variance	1.71	0.79	0.79	0.27	1.98
Standard Deviation	1.31	0.89	0.89	0.52	1.41
Total Responses	8	8	8	8	8

6. Em relação à tua experiência na utilização da aplicação Korsakow, por favor indica o teu nível de concordância.*

#	Question	Con-cordo total-mente	Con-cordo	Não concordo nem discordo	Dis-cordo	Dis-cordo total-mente	n	Mean
1	Adaptei-me facilmente à interface do Korsakow.	0	1	2	4	0	7	3.38
2	Considero que aprendi muito pouco nesta actividade.	0	1	4	2	0	7	3.13
3	Considero ser capaz de criar sozinho vídeos interactivos.	2	3	2	0	0	7	2.00
4	Não tive problema em editar e gerir os diferentes recursos que queria usar.	0	3	0	2	2	7	3.38
5	Não tive problemas em editar a interface de apresentação do meu vídeo interactivo.	1	0	2	3	1	7	3.38
6	Espero usar o Korsakow noutros projectos de outras disciplinas. *I hope to use Korsakow application for other school projects.*	0	3	4	0	0	7	2.63
7	Espero usar o Korsakow em projectos fora do âmbito da faculdade. *I hope to use Korsakow application out of school.*	0	3	2	2	0	7	2.88

*The answers of the student that did not use Korsakow were removed in this table

Statistic	Adaptei-me facilmente à interface do Korsakow.	Considero que aprendi muito pouco nesta actividade.	Considero ser capaz de criar sozinho vídeos interactivos.	Não tive problema em editar e gerir os diferentes recursos que queria usar.	Não tive problemas em editar a interface de apresentação do meu vídeo interactivo.	Espero usar o Korsakow noutros projectos de outras disciplinas.	Espero usar o Korsakow em projectos fora do âmbito da faculdade.
Min Value	2	2	1	2	1	2	2
Max Value	4	4	3	5	5	3	4
Mean	3.38	3.13	2.00	3.38	3.38	2.63	2.88
Variance	0.55	0.41	0.57	1.70	1.41	0.27	0.70
Standard Deviation	0.74	0.64	0.76	1.30	1.19	0.52	0.83
Total Responses	8	8	8	8	8	8	8

7. O que consideras que correu bem nesta actividade?

Text Response
a descoberta e exploração de novos conceitos
Por ter feito o trabalho individualmente, não estive dependente de ninguém.
O facto de ter aprendido a lidar com palavras-chave segundo uma lógica para criar uma narrativa não-linear com interfaces diferentes, assim como a exploração de um programa em constante actualização. *The fact that I have learned to deal with keywords within a logic for creating a non-linear narrative with different interfaces, as well as the exploration of a software in constant update*
a interação com os colegas *The interaction with classmates.*
o trabalho em grupo e a interajuda entre os colegas. *The group work and the mutual assistance between students.*
acredito que o processo criativo foi bem identificado com relação as suas fases.

Statistic	Value
Total Responses	6

8. O que consideras que não correu bem nesta actividade?

Text Response
a falta de material indicado para a gravação dos vídeos.
Tive dificuldade em usar o Korsakow, desde a criação do interface, passando pelas imagens de pré-visualização, à própria exportação. Pensei em fazer o trabalho de Projeto em Korsakow, mas mudei de ideias...
Julgo que o programa tem muitos erros, por exemplo, a meio de um trabalho bloquear e ter de se fazer tudo de novo.
No início houve dificuldades em compreender a forma de utilização do programa, foi necessária muita pesquisa e muitas tentativas para chegar ao resultado pretendido e utilizar os vídeos como estava inicialmente planeado. *"In the beginning there were difficulties in understanding the way to use the software. Much search was necessary and several attempts made to reach the intended result and use the videos as was initially planned."*
software ainda em versão beta com muito trabalho pela frente
não tive muito tempo para aprender a utilizar o programa, praticamente foi autodidata.
a falta de compatibilidade entre as ideias para o projeto e as especificidades do programa utilizado

9. Que sugestões propões para melhorar esta actividade?

Text Response
que a escola disponha de tecnologias de captura de video mais modernas.
Talvez uma nova versão do Korsakow, que já não seja beta e não dê tantos erros...
Tentar melhorar os erros do Korsakow e aumentar a possibilidade de manusear o som. Algumas coisas estão muito limitadas.
Penso que mais aulas com exercícios dedicados à aprendizagem do funcionamento do Korsakow antes de passar ao projecto final poderiam ajudar.
uma melhor compatibilidade na conversão de ficheiros de video
mais apoio e acompanhamento dos professores, mais tempo para trabalhar um programa, antes de elaborar um projecto. *More teacher support and tutoring, more time to work with one program before elaborating a project*
as limitações do programa devem ser melhor definidas desde o início, para que as ideias sejam enquadradas nesse âmbito *the limitations of the software should be better defined from the beginning, so that the ideas may be framed in that setting.*

—Multimedia_Metodologia+Projecto

MPM [Arte Multimédia] + PM1 [Ciências da Arte e do Património] | FBAUL 2011/12

Início Calendário Eventos Info Programa **Projecto Referências** Termo

Programa

Deixe um comentário

[Versão em desenvolvimento]

Metodologia Projectual Multimédia | Licenciatura em Arte Multimédia [MPM|AM]
Projecto Multimédia | Licenciatura em Ciências da Arte e do Património [PM1|CAP]

Ano Lectivo 2011-2012 | 1º Semestre

Prof. Mónica Mendes » monica.mendes [at] fba.ul.pt

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AULAS | HORÁRIO
Terças: 17h-20h Metodologia Projectual Multimédia [MPM|AM] + Projecto Multimédia I [PM1|CAP]
Quintas: 17h-18:30h Metodologia Projectual Multimédia [MPM|AM]
Sala 3.07

Horário de acompanhamento
Terças 20-21h + Quintas 16-17h e 18h30-19h30 | Ponto de Enconto: Sala 3.07

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» CONTEÚDOS PROGRAMÁTICOS

Conceber ideias | Representar conceitos | Apresentar projectos
Investigação para enquadramento artístico e fundamentação científica.
Agilizar métodos recurrendo a aplicações FLOSS (Free and Open Source Software).
Operacionalizar conceitos | Prototipar.
Apresentar e divulgar.

Conteúdos Essenciais:
Terminologia | Criadores | Linguagens | Creative software | Computação física
Análise de Tarefas | Usabilidade | Tipografia | Prototipagem

—
» OBJECTIVOS DA UNIDADE CURRICULAR E COMPETÊNCIAS A ADQUIRIR
Apreender e praticar as diversas etapas de um projecto multimédia, com uma perspectiva global e atitude crítica.
Criação de estruturas hiperlineares com nós e links. Definição de enquadramento teórico conceptual artístico e tecnologias implicadas na sua implementação. Os alunos ficarão a saber gerar ideias, representá-las através de esboços e protótipos de fases preliminares (a desenvolver tanto quanto possível dentro das limitações do semestre) e apresesentá-las online.

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» BIBLIOGRAFIA PRINCIPAL

LOVEJOY, Margot, PAUL, Christiane, VESNA, Victoria (ed), (2011) Context Providers: Conditions of Meaning in Digital Arts, Intellect, UK

MAEDA, John (2004) Creative Code: Aesthetics and Computation, Thames and Hudson

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» REFERÊNCIAS ADICIONAIS

BOLTER, David, GROMALA, Diane (2005) Windows and Mirrors: Interaction Design, Digital Art, and the Myth of Transparency, The MIT Press (Leonardo Books), Cambridge, Massachusetts

BUXTON, Bill (2007) Sketching User Experiences: Getting the Design Right and the Right Design, Morgan Kaufmann

HACKOS, JoAnn, REDISH, Janice [1998] User and Task Analysis for Interface Design, New York,

ALUNOS

Wiley Computer Publishing, John Wiley & Sons, Inc.

LAUREL, Brenda, MOUNTFORD, S. Joy, coord. [1998] The Art of Human-Computer Interface Design, Addison-Wesley Publishing Company

GRAU, Oliver (2007), MediaArtHistories, Cambridge, Massachusetts Institute of Technology.

» PLATAFORMAS DE TRABALHO
Blog wordpress para comunicar métodos/Processo » http://multimedia201112.wordpress.com
Moodle para assuntos académicos
Cargo collective para galeria final » http://cargocollective.com

—
» METODOLOGIA DE ENSINO | AVALIAÇÃO

A disciplina terá avaliação continua, com conteúdos teóricos apresentados nas aulas, referências para posterior reflexão, e exercicio práticos concretizados com ferramentas multimédia.

Conteúdos:
Pensamento divergente e convergente. Gerar ideias e definir conceitos
Investigar com enquadramento artistico, tecnológico e cientifico
Agilizar métodos através do recurso a aplicações FLOSS (Free and Open Source Software)
Operacionalizar conceitos
Prototipar
Apresentar e divulgar

—
CRITÉRIOS DE AVALIAÇÃO

I. Participação e aprendizagem nas aulas
II. Concretização das diversas etapas das FASES 1, 2 e 3 do projecto proposto
III. Apresentação e publicação dos resultados

Na realização das etapas do projecto serão valorizados os seguintes aspectos:
Criatividade | Originalidade
Pesquisa
Evolução | Implementação
Apresentação
Cumprimento dos prazos.

Faculdade de Belas-Artes da Universidade de Lisboa, 11 de Outubro de 2011

PROGRAMA

Metodologia Projectual Multimédia
Licenciatura em Arte Multimédia
[MPM|AM]

Ano Lectivo 2012-2013 | 1º Semestre

Prof[redacted][at] fba.ul.pt

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AULAS | HORÁRIO
Terças: 17:00-18:30 + Quintas: 17:00-20:00 | Sala 3.07

Horário de acompanhamento
Terças 16:00 + Quintas 20:00-21:30 | Ponto de Encontro: Sala 3.07

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CONTEÚDOS PROGRAMÁTICOS

Nesta disciplina são proporcionadas referências e práticas para que os alunos venham a apreender e concretizar as diversas etapas de projectos multimédia, individualmente ou em equipas. Os conteúdos essenciais incluem: metodologias, processos iterativos, estruturas não-lineares, terminologia, criadores, software para criatividade, vídeo interactivo, análise de tarefas, usabilidade, prototipagem.
É proposto um projecto que inclui a criação de estruturas não-lineares com nós e links, o enquadramento conceptual e tecnológico e o desenvolvimento de uma proposta final através de:
» investigação para enquadramento artístico e fundamentação científica, » agilização de métodos recorrendo a ferramentas de software
» operacionalização de conceitos através de protótipos
» apresentação e divulgação de conteúdos multimédia – presencialmente e online.

—
OBJECTIVOS DA UNIDADE CURRICULAR E COMPETÊNCIAS A ADQUIRIR
Apreender e praticar metodologias para concretização de um projecto multimédia, com uma perspectiva global e atitude crítica.
Criação de estruturas hiperlineares com nós e links e conteúdos multimédia.
Definição de enquadramento teórico conceptual artístico e tecnologias implicadas na sua implementação.

Os alunos ficarão a saber gerar ideias, representá-las através de estruturas não-lineares (como mapas conceptuais) e protótipos multimédia (como vídeo interactivo) e apresentá-las online (como galerias multimédia).

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BIBLIOGRAFIA PRINCIPAL

HANNINGTON, Bruce, MARTIN, Bella (2012) *Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions* (http://http://books.google.pt/books?id=uZ8uzWAcdxEC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false), Rockport Publishers.

RIBEIRO, Nuno (2011) *Multimédia e Tecnologias Interactivas (http://www.fca.pt/cgi-bin/fca_main.cgi/?op=2&isbn=978-972-722-744-0),* 5.ª Edição Atualizada e Aumentada. ed. 5, 1 vol.,FCA – Editora de Informática, Lda., Lisboa, Portugal.

PREECE, Jennifer, ROGERS, Yvonne, SHARP, Helen (2011) *Interaction Design: Beyond Human – Computer Interaction* (http://books.google.pt/books?id=b-v_6BeCwwQC&printsec=frontcover&dq=Interaction+Design:+Beyond+Human+-+Computer+Interaction&source=bl&ots=QHnQ-aELsa&sig=gvv06ZYwnORzzTLxXZwXDAXkziE&hl=en&sa=X&ei=S_tqUMWMBJGIhQevooGAAg&ved=0CDEQ6AEwAA#v=onepage&q&f=false), 3rd Edition, John Wiley & Sons Ltd.

REFERÊNCIAS ADICIONAIS

BOLTER, David, GROMALA, Diane (2005) *Windows and Mirrors: Interaction Design, Digital Art, and the Myth of Transparency*, The MIT Press (Leonardo Books), Cambridge, Massachusetts.

BUXTON, Bill (2007) *Sketching User Experiences: Getting the Design Right and the Right Design*, Morgan Kaufmann.

GRAU, Oliver (2007) *Media Art Histories*, Cambridge, Massachusetts Institute of Technology.

HACKOS, JoAnn, REDISH, Janice (1998) *User and Task Analysis for Interface Design*, New York, Wiley Computer Publishing, John Wiley & Sons, Inc.

LAUREL, Brenda, MOUNTFORD, S. Joy, coord. [1998] The Art of Human-Computer Interface Design, Addison-Wesley Publishing Company.

LOVEJOY, Margot, PAUL, Christiane, VESNA, Victoria (ed), (2011) Context Providers: Conditions of Meaning in Digital Arts, Intellect, UK.

MAEDA, John (2004) Creative Code: Aesthetics and Computation, Thames and Hudson.

MUNARI, Bruno (1997) "Design & Comunicação Visual: Contribuição para uma metodologia didática", Trad. Daniel Santana, São Paulo: Martins Fontes.

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PLATAFORMAS E FERRAMENTAS DE TRABALHO

CONCEPTUALIZAÇÃO
Brainstorming e planeamento através de mapas conceptuais » Vue (http://vue.tufts.edu/) e/ou Prezi (http://prezi.com/)

EDIÇÃO
Edição de vídeo » Lightworks (http://www.lwks.com/) e/ou Final Cut Pro (http://www.apple.com/finalcutpro/)
Conversão de vídeo » VLC (http://www.videolan.org/vlc/index.html) e/ou HandBrake (http://handbrake.fr/)
Criação de vídeo interactivo » Korsakow (http://korsakow.org)

PUBLICAÇÃO
Blog para comunicar métodos/Processo » http://mpmultimedia201213.wordpress.com (http://mpmultimedia201213.wordpress.com)
Galeria para apresentação final » http://cargocollective.com/mpmultimedia201213 (http://cargocollective.com/mpmultimedia201213)

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METODOLOGIA DE ENSINO | AVALIAÇÃO

A disciplina terá avaliação contínua, com conteúdos teóricos apresentados nas aulas, referências para posterior reflexão, e exercícios práticos concretizados com ferramentas multimédia.
Conteúdos: pensamento divergente e convergente, gerar ideias e definir conceito, investigar com enquadramento artístico, tecnológico e científico, agilizar métodos através do recurso a aplicações FLOSS (Free and Open Source Software), operacionalizar conceitos, prototipar, apresentar e divulgar.
A aplicação prática das metodologias projectuais multimédia é concretizada através de diversas etapas nas fases de (I) CONCEITO, (II) DESENVOLVIMENTO e (III) APRESENTAÇÃO.

Projecto
CONCEITO » Etapa 1. Investigação inicial | Etapa 2. Brainstorming de Ideias | Etapa 3. Selecção de Ideia e Especificações
DESENVOLVIMENTO / REPRESENTAÇÃO » Etapa 4. Estrutura do projecto video interactivo | Etapa 5. Registo, edição e pré-selecção de vídeos | Etapa 6. Integração em Korsakow
APRESENTAÇÃO » Etapa 7. Publicação e Divulgação online.

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CRITÉRIOS DE AVALIAÇÃO

I. Participação, aprendizagem e concretização dos exercícios nas aulas
II. Concretização das diversas etapas das fases de conceito, desenvolvimento e apresentação do projecto
III. Apresentação e publicação dos resultados.

Na realização das etapas do projecto são valorizados os seguintes aspectos:criatividade e originalidade, evolução e implementação, apresentação, pesquisa e referências, e cumprimento dos prazos.

[Grelha de avaliação a apresentar na aula].

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Faculdade de Belas-Artes da Universidade de Lisboa, 2 de Outubro de 2012

Expectations Mentioned	Times mentioned		
	2011	2012	Total
Learn informatics and new applications	17	3	20
Learn web design	15	0	15
Readiness for job offers	8	1	9
Develop interactive video/environments	6	2	8
Editing video	5	2	7
Acquire visual and multimedia culture	3	3	6
Learn project methodology	3	2	5
Editing image	2	2	4
Develop multimedia materials	2	1	3
Programming	2	1	3
Editing sound	2	0	2
Develop applications for mobile platforms	1	0	1
Develop Networking skills	0	1	1
Develop creativity	0	2	2

Used application mentioned	Times mentioned		
	2011	2012	Total
Photoshop	32	5	37
Premiere	21	1	22
Illustrator/Freehand/Indesign	18	3	21
Microssoft Office/ Open Office	16	2	18
Facebook/ Google sites/ Youtube	10	0	10
Autocad/Solid Works/Blender	9	1	10
After Effects/ Avid/ Final cut pro	7	3	10
Flash	7	2	9
Corel/Photostudio	7	2	9
Light Wave/ Sketch Up/poser	5	1	6
Garage Band/ Soundboth/ Reason	3	0	3
Dreamweaver	1	2	3
iMovie/Movie Maker/Corel Studio Video Pro	0	3	3
Fireworks	0	2	2
3D Studio	0	1	1

Want to learn mentioned application	Times mentioned		
	2011	2012	Total
Flash	6	1	7
Illustrator/Indesign	5	2	7
Dreamweaver	5	0	5
After Effects/ Avid/ Final cut pro	4	1	5
Premiere	3	1	4
Maya / 3D Studio Max	2	1	3
Autocad/Solid Works/Blender	2	0	2
Photoshop	1	1	2

Total of maps analyzed	39	7	46

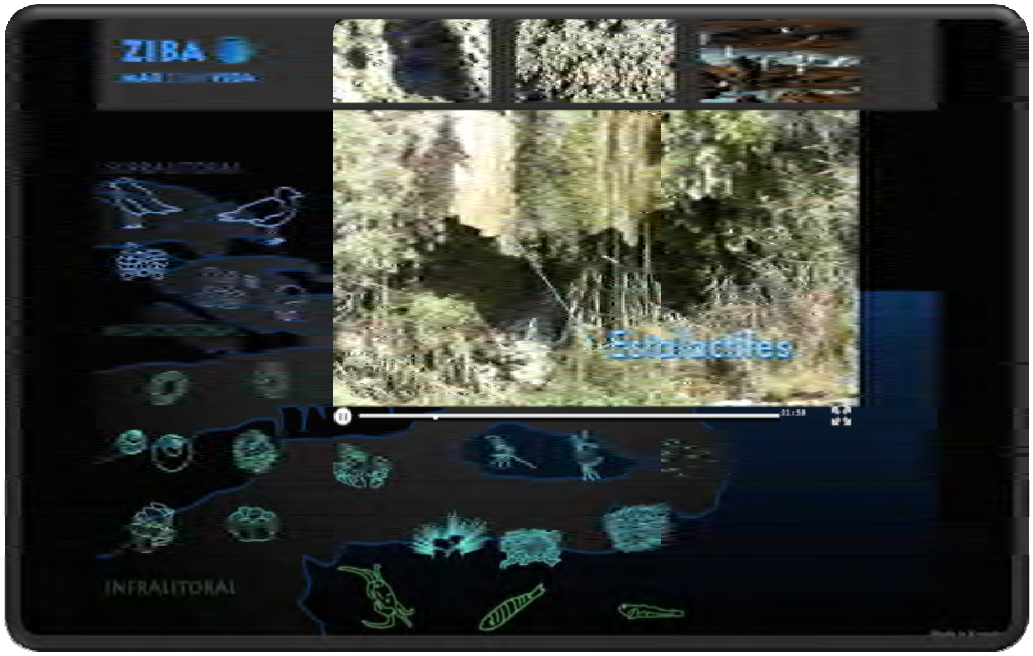
	Number of students in 2012
Participants in the feedback	7
Mapping tool as learing outcome	2
Video edition as a learning outcome	2
More software diversity	3
More peer-to-peer interaction	1
Korsakow as a learning outcome	7
Would like to use Korsakow in the future	4
Positive comment to liberty of choice	1
Referring issues with Korsakow	4
Suggesting more liberty of choice	3

Comments in 2012	**Original**	**Translation (by author)**
Most relevant suggestion	Penso que seria positivo dedicar mais aulas a tutoriais e experiências com o programa	I think it would be good to have more classes with tutorials and experiences with the program [Korsakow]
Most relevant positive comment	o Korsakow mostrou-se um programa que permite fazer mais que aquilo que precisava. Depois de algumas explicações, o programa é fácil de trabalhar.	Korsakow revealed to be a program that can do more than what I needed. After some explanations the program is easy to work with.
Most relevant negative comment	Houve dificuldades em compreender o funcionamento do korsakow que foram ultrapassadas	There were difficulties in understanding the way Korsakow works but they were overcome
	A qualidade dos vídeos ficaram aquém do esperado um pouco por causa do Korsakow. Tem alguns "craches"	Video quality was not as good as expected because of Korsakow. And Korsakow has some crashes.
Most relevant comment on project stages	Pesquisa - Bastante importante para chegar ao conceito (achei muito produtivo o conceito trabalhado); 2/3 mapas conceptuais - é uma fase um pouco chata mas necessária para a concepção do trabalho; Microestrutura/macroestrutura - através das quais foi possível organizar e estruturar o trabalho final; 5 - Divulgação/trabalho final - no final fiquei satisfeita com o resultado final. Julgo ter concebido algo simples, intuitivo e divertido	Search - very important to reach the concept (I think the worked concept was very productive). Conceptual maps - it is a dull stage but necessary for conceptualizing the work. Microstructure/Macrostructure - allowed structuring the final work. Final work and outreach - In the end I was satisfied with the final results. I believe to have conceived something simple, intuitive and fun.

Ziba project

Project develop by one of the students in 2012 (Universidade de Lisboa). Courtesy of the author.

To open project double click on the file ziba.html in the folder A23 - Ziba project in the CD-ROM provided with this thesis (The project will need *Adobe Flash Player* to run).



Blog Analysis

	2011/2012	2012/2013
Enrolled students	42	15
Active students	42	14
Professor's posts	19	19
Students' posts	115	81
Total posts	134	100
Average posts per active student	2,7	5,8
Total comments	27	26
Students' comments	15	23
Average comments per active student	0,4	1,6
Students' rich comments	1	7
Professor's comments	12	3
Replies to comments	3	3
Non mandatory posts	2	17
Phase 1 external links	64	79
Posts' word count	14200	13500
Images count	200	120

Initial professor semi-structured interview script

Your perception of technology

From your experience:

1. Some teachers believe that too much use of technologies may replace teachers in the future. Do you agree? Why?
2. Do you think teachers have to be technology experts to teach students how to use it?
3. What do you think about students creating their own media for learning activities?
   (Do you believe students have enough skills to use digital media by themselves?)
4. Which technological skills do you find more important to teach students in your course?
5. Do you feel it is important to support activities that reach out of school environment? (Would you give any example?)
6. Do you use problem based or project based activities in class? (What are the most significant results you get from these approaches?)

Technology use for educational purpose last year

7. How do you use technology to communicate with your students? *(email, blog, a wiki, forums, ichat, aim, gmail chat, facebook chat, Skype, Twitter)*
8. Do you promote the use of technology for students to communicate with each other? *(email, blog, a wiki, forums, ichat, aim, gmail chat, facebook chat, Skype, Twitter)*
9. Do you feel it may be important for students to show their work online?
10. Do you use the computer often to produce resources to use in class? (Whish applications? How often?) *(MSWord, Exell, PowerPoint, Keynote; Monthly or less, Weekly, Daily, Many times per day)*
11. Which applications have you use in your courses? *(Photoshop, Illustrator, iPhoto, Audacity, GarageBand, iMovie, MovieMaker, Dreamweaver, iweb, googlepages)*
12. Do you use, or teach how to use digital devices? (Which devices?) *(Digital Projector, DVD player,CD player, Mobile laptop carts, Classroom computers, Digital cameras, Digital camcorders, Scanners,Flash drives, External hard drives,licker systems, Chalkboards (wireless tablets), Interactive whiteboards, Videoconferencing Station, Subject-specific software or technology)*

Teaching experience

How long have you been a teacher?

Less than 1 year
1-2 years
3-5 years
6-10 years
11-15 years
More than 15 years

How old are you?

20-30 years
31-40 years
41-50 years
51-60 years
61 + years

Professor Final Semi-structured Interview

Students attitudes and skills

1. Have you felt differences in the behavior of students? (toward the use of Internet, toward the use of technology in general)
2. You think students were motivated using Korsakow application?
3. Do you believe attitudes and skills improved with this activity? Which attitudes and skills? What do you think supported these results? (critical thinking skills)
4. What do you think about the collaboration between students?
5. What do you think about the interaction between students?
6. How much effort did students apply in this assignment?

Students' outcome

7. What do think about the overall quality of the final works and presentations?
8. Do you believe the activity provided good understanding of key concepts or difficult subjects?
9. Were the solutions developed by the students creative?
10. Were there works that showed critical thinking? example
11. Do you think this activity supported new strategies for study and working?
12. Do you think the activities promoted good interaction between students? How could it be enhanced?
13. Do you think there was a healthy competition between students? What do you think could be done to promote it?

Korsakow usage

14. You found the application easy to use? Why? Good things… bad things
15. Do you believe students had a hard time adapting to the Korsakow's interface?
16. Do you believe students had a hard time adapting to the semantic logic and the idea of nonlinearity of the editing?
17. Would you use Korsakow again with students?
18. Would you use it yourself? Other then teaching purposes or other?
19. What would be good improvements to the application for teaching purposes?
20. Do you think students engaged in good strategies to achieve their goals?

Technologic Activity Design

21. Would you use this kind of activity in future seminars?
22. What would you change?
23. Would you recommend it to other teachers with different seminar? Which?
24. What do you think is the main virtue of this activity?
25. What do you think are the weaknesses?

Guidelines for the Questionnaires

Students diagnosis inquiry

Characterization

1. Name:
2. Age (18-20; 21-23; 24-26; 27 or more)
3. Gender (Female; Male)

Hardware

Do you have?

4. Personal laptop
5. Personal desktop where you live
6. Mobile phone with camera
7. Digital video Camera
8. Broadband connection where you live

Technology usage (relative to your activity last year)

General

How much time on an average day you spend with each activity? (0, less than 1h, 1h - 2h, 3h - 4h, 5 - 6h, more than 7h)

9. Studying books?
10. Studying with your friends?
11. Studying online?
12. Searching in the web?
13. Watching videos online?
14. Watching TV?
15. Listening to music?
16. Playing video games?

Web activities:

(Yes, I've done this. No, I've never done this; How often do you do each activity? Monthly or less, Weekly, Daily, Many times per day;

17. Use a search engine to find information (*Google, Yahoo!*)
18. View or listen to music or videos (*YouTube, Hulu, Limewire*)
19. Follow podcasts and/or download music or videos
20. Use the school or local library website
21. Participate in social networking websites (*Facebook, MySpace*)
22. Play video games online connected to other players (*World of Warcraft, Poker, Halo, Call of Duty, Runescape*, etc.)
23. Participate in online Virtual worlds (*Second Life*)
24. Share photos or videos (*blogs, flickr, podcasts, vodcasts*)

25. Use internet on your mobile phone?

Social Networking

(Yes, I've done this. No, I've never done this; How often do you do each Communication activity? Monthly or less, Weekly, Daily, Many times per day; Where do you use each Communication activity? (check all that apply) I use this in school I use this out of school; How skilled you consider yourself using each Communication technology? Beginner, Intermediate, Expert)

26. Read / Send email
27. Read a blog, a wiki, and/or an online discussion forum
28. Write/Comment on blog(s), a wiki, and/or online discussion forum
29. Participate in text-based instant messaging (*ichat, aim, gmail chat, facebook chat*)
30. Text messaging on phone
31. Participate in Online Audio/Video interactions (*ichat, Skype*)
32. Tweet / Follow on Twitter

Productivity:

Do you use any of the following technologies? How skilled you consider yourself using each type of technology? Beginner, Intermediate, Expert)

33. Word Processing (*MSWord*, etc.)
34. Spreadsheets (*Excel*, etc.)
35. Presentation software (*PowerPoint, Keynote*, etc.)
36. Concept Maps (*Inspiration, Visio, Cmap*, etc.)

Creativity:

Do you use any of the following technologies? How skilled you consider yourself using each type of technology? Beginner, Intermediate, Expert)

37. Image creating /editing application (*Photoshop, Illustrator, iPhoto*)
38. Audio creating /editing application (*Audacity, GarageBand*)
39. Video creating /editing application (*iMovie, MovieMaker*)
40. Web pages creating /editing application (*Dreamweaver, iweb, googlepages*)

Your opinion on digital technologies

Relative to your experience tell us how much you agree with the statement.

Likert Sale: (Strongly agree, Agree, Neither, Disagree, Strongly disagree)

41. I get more actively involved in classes that use technology.
42. The use of technology in my classes improves my learning.
43. I become more off-task as more technologies are used in class.
44. I read and study better online
45. I like using computers in class
46. I believe most of what I watch on TV
47. I believe most of what I read in books
48. I believe most of what I read online
49. I believe most of what I watch online

Students' Satisfaction Questionnaire

Your opinion about the technologic activity

Relative to your experience with the technologic activity tell us how much you agree with the statement. (Likert Scale: Strongly agree, Agree, Neither, Disagree, Strongly disagree)

General

1. I enjoyed the overall learning activity where we developed interactive movies.
2. The technical support was adjusted to my needs.
3. I was satisfied with the movie we developed.
4. The activity increased my motivation to study online.
5. The tasks were challenging.
6. I enjoyed doing the activity.
7. The activity was very demanding.
8. I considered the activity was a waste of time.

Searching the internet and social networking

9. It was difficult for me to find media online.
10. The Internet was useful to exchange information with group members.
11. I could find ways to check the quality and accuracy of the media I chose for my project.
12. The teacher helped to develop my project.
13. Online communication with the teacher was appropriate.
14. It was easy to share media and information.
15. Team work was good.
16. I used online forums to change information out of the class.
17. I feel more aware of potential risks when using the internet.

Editing and managing media

18. I had no trouble editing the media I wanted to use.
19. It was hard to master and use of the concept mapping tools.
20. I learned a lot watching lots of videos online.
21. I easily developed concept maps of the topics I wanted to address.
22. It was hard to choose keywords for tagging the media I wanted to use.

The Korsakow application

23. I easily adapted to Korsakow's interface.
24. Linking all the videos together helped to have a broader perspective on difficult concepts.
25. I feel that I learned very little in this activity.
26. I feel that I am now able to build interactive movies by myself.
27. In this activity, I had no trouble editing the media I wanted to use.
28. I hope to use Korsakow application for other school projects.
29. I hope to use Korsakow application out of school.

Written feedback:

30. What did you find that worked well in this activity?
31. What did you find that did not work well in this activity?
32. What would you suggest to make this activity better?

Would you be available for group or individual interview? (If so leave your contact for us to reach you later)